

THE IRON AGE

THURSDAY, OCTOBER 27, 1892.

The Hercules Forging and Bending Machine.

The Hercules Iron Works of Chicago are building a new design of forging and bending machine. It is designed more as a forging than a bending machine, although it will do all the bender's work. It has an adjustable stroke, so that work requiring a great pressure can be done and the danger of breakage of gearing be entirely avoided. The strength of the bed and the changeable stroke admit of nearly all bending being done cold.

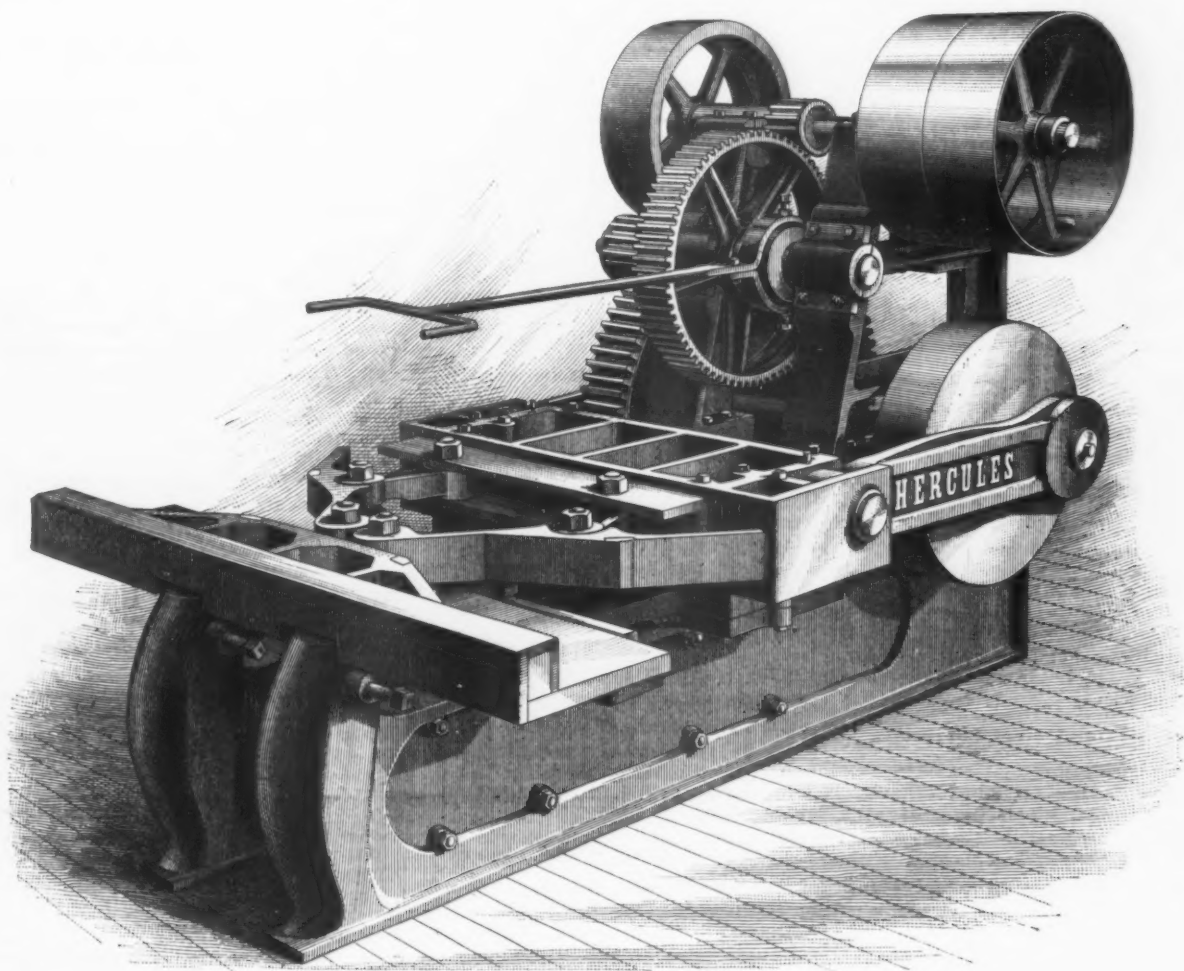
The die plate for holding forms and dies has a depression or jaw into which the

which a steam cylinder can be attached, so that the machine may be driven by steam direct if wanted. The manufacturers of these tools make six sizes of machines, ranging in weight from 4000 to 40,000 pounds if wanted.

A Big Sound Boat.

On Tuesday the 18th inst., at the shipyard of the Delaware River Iron Shipbuilding and Engine Works, Chester, Pa., the first section of keel was laid for a new steamer for the Old Colony Steamboat Company of New York, which is designed to beat the record for size, speed and carry-

sinkable. The motive power will be supplied by 8000 horse-power double inclined compound engines, working side wheels with feathering buckets, and the boat will be fitted with ten Scotch boilers and two smoke stacks. The speed expected to be obtained is 22 knots per hour. Accommodation is planned for about 1500 passengers in between 400 and 500 state rooms; while the freight carrying capacity will be 1000 tons or more. The general design and arrangements are almost similar to those of the "Puritan," with the exception of the saloon, which will be placed on the main deck aft, instead of below. The cost is calculated to reach the neighborhood of \$1,250,000; and it is stated that



THE HERCULES FORGING AND BENDING MACHINE.

bottom of the die drops, and admits of the use of a lighter die than was formerly used, and is so arranged that one or more forms or dies can be used at the same time. The die is adjusted by a double wedge block, drawn crosswise of the machine at the back of the die plate. It will resist heavy strain without injury to the screws supporting the die. Upon the back of the machine and acting on the main gear is a pawl that allows the machine being stopped at its extreme backward stroke. This will prevent a dropping down of the cranks to the bottom quarter and the throwing forward of the head on the slides after the clutch has been thrown out. Attached to the main shaft near the main gear, and not shown in the engraving, is an automatic stop, that can be arranged to stop the machine at any point. At the back of the bed is a flat plate to

ing powers of any vessel of her class at present afloat. The new vessel is to supplement the company's Sound fleet, which includes the fine well-known boats "Puritan," "Pilgrim" and "Plymouth," all of which were built at the Delaware River Shipyard, and are splendid specimens of maritime architecture.

The following are the principal dimensions of the ship in question: Length, over all, 440 feet (or 20 feet more than the "Puritan," at present the longest similar vessel); length on water-line 424 feet; depth of hull, 20 feet 6 inches; depth from top of dome, 58 feet; beam, over hull, 52 feet; beam, over barge, 92 feet. The vessel will be constructed entirely of steel, and will be absolutely fire proof. She will have a double hull on the bracket system, divided into 58 water-tight compartments, which will render her non-

the boat when completed will be far ahead of any hitherto launched for similar service. Work will be pushed on as rapidly as possible; all the resources of the shipyard being used to enable the vessel to take the water by next July, if possible.

Pintsch Gas Lighting.

Prof. J. E. Denton of Stevens Institute of Technology has been making thorough experiments testing the candle-power of Pintsch gas and oil lamps. The substance of the report shows that Pintsch gas is capable of affording an illumination of 40 candle power, continuously, in an ordinary 4-flame lamp, without requiring anything more than the ordinary attention to lamps by railroad employees; whereas the latest improved argand burners with oil cannot

be made to give more than 16 candles per burner, and with the best form of flat flame, double wick lamps, not more than 8 candles per burner. This shows an average of $2\frac{1}{2}$ to 5 times more illumination by the gas than by the oil, and the tests further show that the heat generated from the oil is 50 per cent. greater than that from the Pintsch gas.

THE INDIANA GAS REGION

The American Tin Plate Company

of Elwood is the most recent complete tin-plate plant erected in this country. It is characterized as complete because it embraces the manufacture of black plates as well as the tinning process. There are four trains of rolls now in use, rolling steel tin-plate bars into sheets for tinning. The engine and other appliances, however, have been built to operate six trains, and the company intend to add the other two trains at an early day. The cold-rolling mills for cold rolling the sheets have been built in the same way, with a view to extension. The tinning house contains ten stacks, but not all of them are yet occupied by pots. The company are introducing the most improved machinery for tinning, and have therefore been in no hurry to fill up their plant with old-fashioned appliances which they may soon be called upon to discard. A Thomas & White tinning machine has just been installed, from which very rapid work is expected. Several of Norton's new automatic tinning machines have been ordered, but they have not yet been received from the manufacturer in Chicago. Within a very short time the output of the works is expected to be from 2500 to 2750 boxes weekly. The product of the plant is already under contract for the rest of this year. The works occupy a most delightful location on high ground, with a stream flowing along the border of the property, affording excellent drainage. It is an attractive place for the employees, to whom pleasant surroundings are as desirable as remunerative employment. A. L. Conger is president; John F. Hazen, vice-president; W. B. Leeds, treasurer, and C. S. Tarlton, secretary.

The Midland Steel Company

of Muncie have just completed their works for the manufacture of light steel sheets. They have four 25-inch trains of rolls, which are run by a Corliss engine, 34 x 60 inch, double geared, and located in the center. Nine heating furnaces are used in connection with these rolls, all of them arranged along one side of the mill in line with the rolls. This part of the plant is now actively at work, with orders booked for the entire output for the next six or eight weeks. The company have under construction an open hearth steel works and a universal mill, which will be used for blooming ingots. The open-hearth works will contain two 25-ton furnaces, with room for a third, which will be added when needed. The universal mill is placed between the steel works and the sheet mill, and will have 24-inch rolls, with tables, designed by President Beatty. The construction of the steel works is being actively pushed, and they will be in operation early in November. The entire works are new in every respect, thoroughly modern machinery has been secured for every department, the buildings are of a most substantial character, and the builders regard the plant as a model of its kind. No provision has been made for the manufacture of iron. The product will be exclusively of steel. After the steel works are completed the output will comprise high-grade, open hearth steel sheets, universal plates, tin-plate bars, billets and

sheets for tinning. R. J. Beatty, formerly with the W. Dewees Wood Company, is president, John A. McVoy of Chicago is vice-president, James Collord of Pittsburgh is treasurer, George Abel is secretary and John Darrall is manager of the finishing mill. Immediately adjoining the Midland works is the

John McVoy Galvanizing Works,

which have been removed to Muncie from East Chicago. The sharp competition in the galvanized iron trade has made it necessary for manufacturers to get as close to their raw material as possible, and these works are now by the side of a sheet mill from which they will obtain most of the sheets needed to supply their requirements. The capacity of the new plant is double that of the old works at East Chicago. The Davies automatic galvanizing process will be used.

The Indiana Iron Company

of Muncie have a very good rolling mill, composed principally of the equipment formerly in use at Lancaster, Ohio. They have 24 puddling furnaces, 5 heating furnaces and 3 trains of rolls—18, 16 and 10 inch. The works are running full time and turning out an excellent quality of bar and guide iron. Three fire brick and iron buildings are in course of erection in connection with the rolling-mill plant, in which will be installed the machinery of the works hitherto known as the Toledo Bolt and Nut Works of Toledo, Ohio, now owned by the Indiana Iron Company. George O. Cromwell is general manager.

The Muncie Nail Company

of Muncie have as yet taken no steps to rebuild their cut-nail factory, which was recently burned. For the present no decision has been made on this point, as there are important questions to be determined first. In the meantime the company are exclusively manufacturing muck bar, their puddling furnaces and muck mill having been saved. They are turning out 50 tons daily, for which they find a ready sale.

The White River Iron Company

of Muncie have a rolling mill containing two heating furnaces and two trains of rolls, 8 and 9 inch, removed this year from Anderson, where the plant had been in operation but a short time. They manufacture bar iron.

The City Enterprise Company

of Muncie have been remarkably successful this year in bringing new enterprises to the city. The members of this company are business men of Muncie, who have contributed \$200,000 for this purpose. Their affairs are managed by a board of directors, who carefully investigate all candidates for their favor, and, if approved, they then turn them over for additional investigation by an advisory committee, composed of the presidents of the local banks and other prominent business men. If their report is favorable, steps are taken to induce the parties to locate in Muncie. Owners of land are communicated with, citizens are asked to subscribe for stock, and in some cases a cash bonus is advanced from the fund. A large number of important factories have already been secured, and only \$50,000 has so far been expended from the company's funds. One of the largest enterprises thus obtained is the

Whitely Harvesting Machine Company,

whose works are now being removed to Muncie from Springfield, Ohio. William N. Whitely, the head of this establishment, has 350 patents on improvements in har-

vesting machinery and now has 52 applications pending in the Patent Office, covering the new ideas in machines to be made in Muncie. The construction of this factory is after a peculiar and pet plan of Mr. Whitely's, adopted as the most practical factory building for the purpose after his years of experience. Every building will be one story and of uniform width—40 feet. Every floor will be on an exact level; trucks loaded with tons of material can be moved on train tracks over the whole plant by one man with little effort. There will be no expensive elevators, but every floor will be on an exact level with the car floor as it stands on the track to load or unload. The main building will be 40 x 600 feet, from which two wings 40 x 600 feet will extend. From each of these wings five small wings 40 x 200 feet will be built, making a total floor space of over 152,000 feet. The roofs of the shops will be high, supported by single trusses with no supporting posts. The windows will be large and more than 1200 of them. The whole building, it is claimed, will be the best lighted, best heated and best ventilated, most comfortable for the men and most economical for the proprietors of any similar plant in the world. Mr. Whitely hopes to be able to employ 500 men within four or five months, and to reach 1000 by the harvest of 1893. This force will be increased to 2000 men when the whole plant is completed.

Mr. Whitely has built three large shops in Springfield, and has built and operated large works in Lancaster, Pa., in Hamilton, Ohio, in Maryland, in Missouri, in Wisconsin, and two immense establishments in Canada, and now he says he has come to the gas fields of Indiana for the crowning, supreme effort of his life. He will manufacture binders, mowers, hay rakes, hay tedders, corn harvesters and lawn mowers. Several other large Springfield industries are reported to be arranging to locate at Muncie.

Other Muncie Factories

are the Muncie Wheel Company, manufacturing carriage wheels; Common Sense Engine Company, agricultural implements; Muncie Rivet and Tack Company, rivets, tacks, &c.; Ohio Wagon Works, wagons, ambulances, &c.; Boyer & Kandel Carriage Company, carriages.

The Akron Steam Forge Company

of Akron, Ohio, have just completed negotiations for a location at Muncie, and expect to have their works in operation there by January. They will manufacture car axles and heavy iron and steel forgings.

The Bonney Rapid Vise Company

of Marion occupy a brick two-story structure, equipped with planers, lathes, drills, milling machines, jigs, &c., for the manufacture of vises and other specialties. They make 33 different styles of vises, their leading product being the Bonney rapid vise. Steel bars are used only in these vises, most of the bars being cold-rolled steel. Their pipe vises have proved very popular, and are now in use in many of the best machine shops in the country. A very neat arrangement has been devised for holding brass jaws in the rapid vise. Two holes are drilled in the stems of each jaw just below the shoulder. A brass plate with two prongs extending below it at right angles is then slipped on each of the vise jaws, and the prongs entering the holes securely hold the brass plates in position, so that they cannot fall out when the jaws are being moved forward and backward. A lathe dog is manufactured which holds round work on a lathe by means of a screw easily adjusted by hand. A new cheap lathe will soon be brought out. The bed plate and head and tail

stocks are cast in one piece. All parts of the vises made by this company are interchangeable. A neat 20-page catalogue is published, giving cuts and descriptions of the company's products.

The Westerman Natural Gas Iron Company

of Marion manufacture bar iron exclusively from scrap. They have four heating furnaces and two trains of rolls. Carefully selected scrap is used, and it is cleaned in tumbling barrels before being piled, so as to divest it of all dirt. Toes and calks are cut from old horseshoes to avoid any admixture of steel. The iron turned out after such careful preparation is of high grade, and is used for bridge work, screws, rivets, staybolts, horseshoe bars, &c. The demand for the company's product has latterly been so heavy that the mill is now running double turn. George Westerman is president and superintendent, and S. N. Gallup is secretary and treasurer.

The Sweet & Clark Company

of Marion make malleable castings, currys and saddlery hardware specialties. Their malleable castings are furnished to car builders, agricultural implement manufacturers and other large consumers. The buildings now in use cover some 4 acres. There are eight structures in all, built of brick and very substantial. The company claim to be the only concern in the country running malleable works exclusively with gas. They use no coke or coal in any part of the plant except in a small cupola used for making pots for annealing. The air furnace operated by gas was designed and patented by the superintendent of the works. The present capacity of the plant is 350 tons of castings per month. The works have been running up to their full capacity for the whole year, and the enlargement of the plant is contemplated in the near future, as the demand seems destined to increase rather than to decline. Wm. M. Peckham is president and Charles J. Clark treasurer.

The Columbia Zinc Works

have just been started at Marion. The plant is of a new type in many respects, embodying improvements introduced by the superintendent, Wm. F. Oesterle, formerly of Rich Hill, Mo. The roasting of the ore is done in revolving cylinders. The heating of the retorts is part Belgian and part Siemens. The smelter contains 800 retorts, arranged in two tiers, with gas heating apparatus in the center. They are divided into six sections. The charge in each case is 50 pounds of calcined ore and coke. Ore is brought from Missouri. Only refined spelter is made, and the daily capacity of the works is 8 tons. James La Tourette is sole proprietor.

The Marion Handle Works

of Marion manufacture all kinds of D handles. Their business has increased largely since the works were started, but they now manufacture, as another line, boxes for packing glass. The location of numerous glass factories in the vicinity has developed a heavy demand for such boxes.

The Smith Mfg. Company

of Marion are manufacturers of glass oil cans with tin jackets, under patents controlled by the company, and are building up a large trade.

The Barton Bell Company

of Marion are manufacturers of sleigh bells and small gongs. The company's affairs have been managed by a receiver since August 17, but the works have been

steadily in operation. A reorganization is about to be perfected, when the management will be entirely changed. Gas mixers are now being manufactured as an additional line. The business of the past year has not been as heavy as it should have been, but a vigorous push for trade will be made after the reorganization.

The Standard Hub and Block Company

of Marion have just completed a very fine brick factory which is to be used in the manufacture of hub blocks by a newly patented process. The building is 125 by 60 feet, with annexes for offices and other purposes. The process used by this company takes the place of natural seasoning, which requires from one to seven years. They turn out hub blocks in 24 hours which have been pronounced by the trade to be thoroughly satisfactory. The process was first used some two years since in Philadelphia, so that the blocks have been well tried. By means of powerful machinery blocks 7 inches in diameter are reduced to 6 inches, thus hardening and solidifying the fiber. The company claim that hubs made by their process will not check, and the testimonials they show from wheelmakers seem to thoroughly confirm their position. The new plant is being magnificently equipped with most expensive machinery. The company are a Pennsylvania organization. M. H. Harrington of Philadelphia is president; D. G. Evans, vice-president; Robert Boone, secretary and treasurer; H. L. Dubois, superintendent, and H. J. Scheid, assistant superintendent.

Gas City,

five miles east of Marion, is coming to the front as an industrial center. The Gas City Land Company control the project, and are offering inducements to manufacturers to locate there. The town lies on the Panhandle Railroad, with the Big Four in easy reach and a belt railroad projected to connect the two systems. The Gas City Land Company have issued a great deal of literature relative to the prospects of their industrial town scheme, giving the natural gas resources, advantages of the location for reaching the markets of the country, proximity to needed raw materials, &c. Although the project was only started in March of the present year, nine factories have already been secured and more are making negotiations. These factories are principally glass works, but among them are the Morewood & Co. tin-plate works, which are projected on a scale of greater magnitude than any of the other establishments.

E. Morewood & Co.

propose to build at Gas City six 25-ton open-hearth steel furnaces, 20 trains of rolls and the requisite cold rolls and tinning stacks, besides machine shops for the manufacture of tin plate machinery. They have already begun the foundations for the plant, and have ordered much of the machinery, some of which is now on the way. Their plans contemplate the expenditure of \$1,000,000, and the erection of the largest tin plate works in the world.

The National Harrow Company, composed of 23 of the leading firms manufacturing harrows in the United States and representing a capitalization of \$500,000, held a two days' meeting in Buffalo last week and elected these officers for the coming year: President, Charles H. Childs, Utica; vice-president, A. O. Bennett, Lansing, Mich.; secretary, William Brinkerhoff, Auburn; treasurer, Edward Norris, Utica; attorney, C. H. Darnell, Syracuse.

Captain Coe's Address.

The annual meeting of the United Forge Masters' Association was held at the Imperial Hotel, New York City, Wednesday and Thursday, October 12 and 13. All members were present. The following officers were elected for the coming year: L. M. Coe of Cleveland, Ohio, president; W. S. Sizer of Buffalo, N. Y., vice-president; F. L. Albott of Cleveland, Ohio, commissioner; Joseph Howard of Buffalo, N. Y., D. S. Bissell of Pittsburgh, Pa., Jas. Johnston of Paterson, N. J., Executive Committee. The usual routine business was transacted, and President Coe delivered the following address:

No one can study with care the last census report of the United States without feeling genuine pride and gratification at the growing prosperity and enormous wealth of our country.

The development of commerce, the astonishing extension of our manufacturing interests placing us first in rank among the nations of the earth; the splendid output of our gold, silver, copper and iron mines; the vast increase of agricultural products enabling us to supply at a moment's notice the markets of the world—all excite our wonder and admiration. We have 44 States owing allegiance to one common flag—a flag everywhere recognized as the symbol of a mighty nation—the home of 65,000,000 of freemen, a land of liberty protected by law, the best product of modern Christian civilization.

Among the great associations of the United States which have kept pace with the marvelous development of our land, we can point with pride to our own. There is no ocean, sea, lake or commercial river in the world where the products of our skill, capital and labor cannot be found. We no longer dread or care for foreign competition, the day for that has passed forever. Slowly, surely, patiently we have gone on step by step, fighting bravely unlimited foreign capital, experience and the highest mechanical skill, until we have demonstrated that American enterprise, American ingenuity, American persistence, American labor rules the world of manufactures, and to-day in our own field of industry we can challenge mankind to produce a successful rival.

As we look back over the history of our organization, we are constrained to admit that its aims, objects and dearest wishes have been largely gratified. Prosperity has welcomed its footsteps, union made for it power, dignity and force. Agreement has banished rivalry and strife, honorable competition, regulated by the laws of our own enacting, has elevated the standard of excellence in product and controlled a market at uniform prices that have proved remunerative and satisfactory in character. We are justly proud of these results, and they demonstrate beyond question the wisdom, usefulness and value of our great association.

It is true, and it is to be regretted, that our union does not comprise all the forges engaged in our industry; but is it not far wiser to try and induce them to join this body and unite their fortunes with us than for us to dissolve our organization and go back to the days of sharp competition, cut prices, scramble for trade, sometimes of inferior production? From my point of view, any other than the first named will prove suicidal to our highest interests. As I reflect upon the past and look forward confidently to the future, I cannot but congratulate each of you, as well as myself, upon the condition of this highly favored land. The march of the nation is forward and upward, and no tongue can foretell its future power and greatness. We are in the midst of a popular election and at this moment engaged in choosing the highest rulers of

the land; yet not a ripple disturbs the peace of the community, for law and order are our daily handmaids.

It is my earnest hope that our descendants shall be as patriotic as their ancestors; that they shall love, honor and reverence their country and its inhabitants, and that you, gentlemen, who have added so largely to its credit and honor may enjoy the fruits you have nobly earned, and that your last days may be crowned with content, affection and the consciousness of duty well done; and when our brief voyage of life is over, may we all find a safe and pleasant harbor on the other side of the great river.

The Bridgman Ore-Sampling Machines.

The correct sampling of ores is a subject of far greater importance than is usually conceded to it. So-called machine sampling may be accomplished in two radically different ways: 1, part of the stream of material is taken for the whole time; 2, the whole stream of material is taken for part of the time. Under the first case the stream, as it issues from the delivery spout of the crusher, is cut continuously in any given proportion, such as one tenth, one fourth or one half, by some fixed apparatus, which, as it contains no moving parts, is strictly speaking not a machine at all, but may be termed an appliance. The principle under which these appliances operate is now pretty generally conceded to be wrong, because of the practical impossibility of cutting such a stream continuously, in such a way as to obtain a proper proportion not only of the stream itself, but particularly of its "coarse" and "fine" parts.

In all sampling operations, whether by hand or machine, certain fundamental truths are recognized, the most important of which is doubtless the proposition that the more uniform the material sampled the truer will be the sample. Such uniformity may be natural or it may be produced by crushing and mixing. The finer the former and the more thorough the latter, the better the result. It is theoretically correct to precede each quartering or cutting down by a crushing, coarse at first and finer with each succeeding cut. In practice, however, rarely more than two crushings are employed, and these are moderately fine, no matter how many cuts may be made. Some works screen their material as it is crushed, returning the "coarse" until all has been reduced to a certain maximum size. This is notably true of hard iron ores. This practice is entirely wrong. The result of the screening is a more or less decided separation of the material into its component parts, as, for instance, into quartz and iron oxide, thus giving, not the desired nor thorough mixture, but a practical undoing of the natural mixture already existing. Of course, remixing may be resorted to; but it would be preferable to crush the entire material once as fine as possible or as may be desirable, and then to sample it, permitting nothing to come between the crushing and the sampling. This latter point is always important, and hence sampling machines should be set directly below the crushing plant, thus avoiding much unnecessary cleaning and risk of "salting" subsequent samples. The assertion that very wet ores can only be sampled by hand is an error. Anything that can be crushed can be sampled by a suitable machine, and material that is too wet to crush cannot be properly sampled, even by hand.

Up to the present time no machine has been introduced which does more than the first portion of the work of sampling. H. L. Bridgman of Blue Island, Ill., has de-

signed a rotary machine which takes the whole stream for part of the time, and which, in a single passage of the material through it:

1. Gives two or more absolutely independent samples (double samples).

2. Cuts down (quarters) each of these samples a sufficient number of times to give the smallest final samples desirable without recrushing.

ing 10 per cent. and over of moisture offers no difficulties; nor does the presence of strings, pieces of wood, and other extraneous substances affect the general result.

5. The quickness with which the samples are obtained makes it possible to use the machine samples for the determination of the moisture, as well as of the metallic and other constituents, which is, of course, a decided advantage.

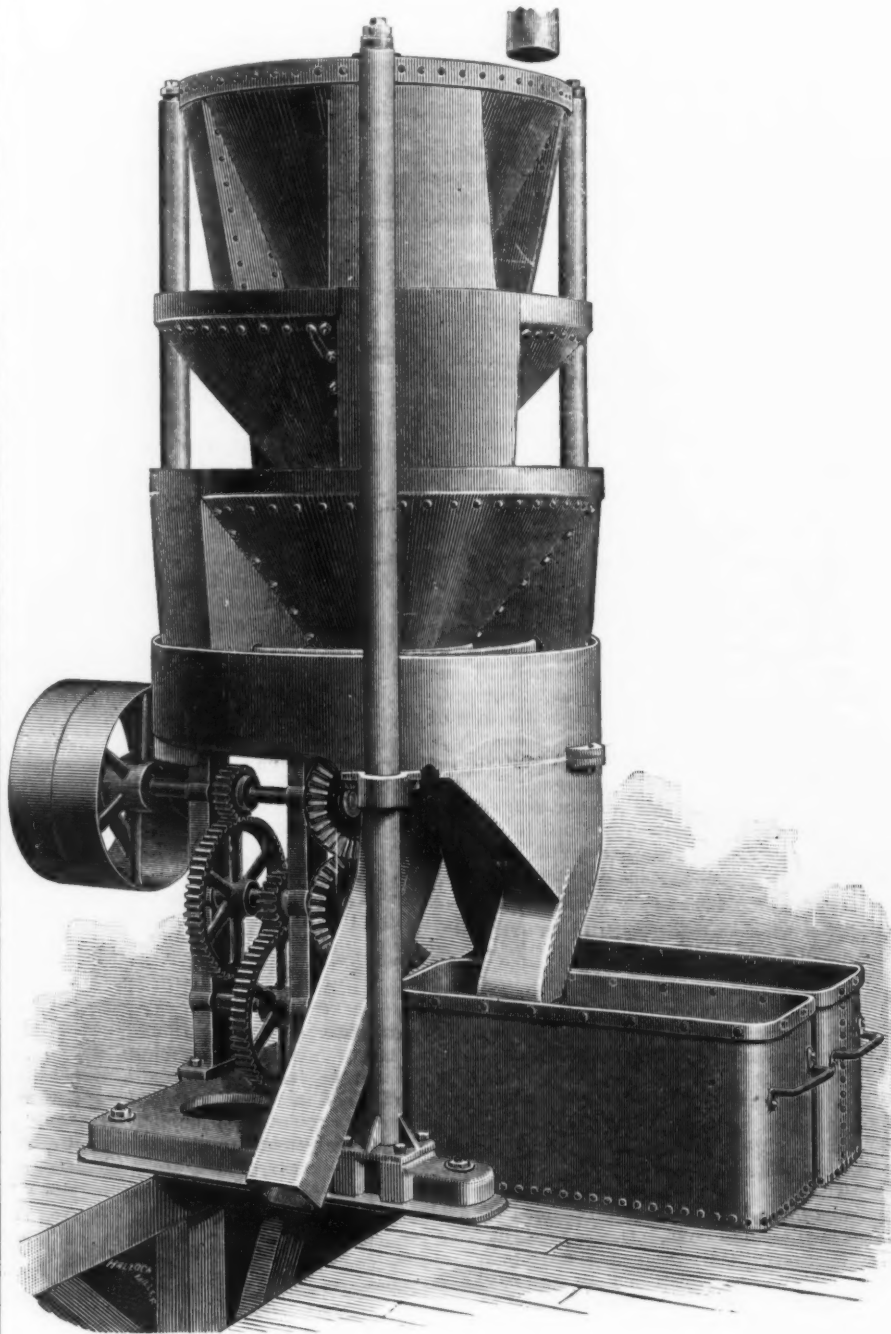


Fig. 1.—The A Machine.

THE BRIDGMAN ORE-SAMPLING MACHINES.

These two principal features are possessed by no other machine of this class, and are supplemented by the following hardly less important ones:

3. It is adjustable to give different sized samples, according to the grade and character of the material treated. The lower the grade, the more uniform the character, and the finer the size of the material, the smaller the final sample may be.

4. All the passages being large and straight, its capacity is very great (from 15 to 25 tons an hour), and it will sample any material that can be fed to it. Ore carry-

6. This quickness, moreover, makes it possible to sample all material as soon as received, with the consequent avoidance of demurrage on cars, and other expensive and annoying delays.

7. The machine gives good results under any ordinary working conditions; it takes its feed directly from crusher or rolls, regularly or irregularly, fast or slow, as the case may be; it requires no attention, except for cleaning out and for the removal of samples, and, in fact, it transfers the important function of sampling from the domain of watchful care and discretion to that of mere routine. Being per-

fectly impartial, and giving double samples, it removes ground for disputes, and renders "salting" practically impossible.

8. It requires less than one-tenth as much space as hand sampling, and delivers the discarded part of the sample in such a way that it can be disposed of by elevator or similar means, requiring no hand labor.

before crushing—these ores seldom requiring moisture determinations. Should such moistening be undesirable, little harm can come of running the ore dry, as no men are about who can be injuriously affected, nor can the flying dust have any marked effect on the sample, and certainly not on any subsequent samples. Wet ores, of course, make little or no dust.

to 1 inch or less, but, if necessary, much coarser product may be run.

Fraser & Chalmers of Chicago build a number of different sizes of machines of Mr. Bridgman's design. Machine A may be chosen, as typical, to illustrate and describe the construction and method of operation. This machine occupies a floor space of 3 x 4 feet, and has a total height of 7 feet 6 inches. It is self-contained, requiring only to be bolted to the floor and to have feed, discharge and belt connections made. Fig. 1 shows the machine as it is built, while Figs. 2 and 3 give the diagraphic sections and details, some minor changes and omissions having been made for the sake of clearness. The machine consists essentially of three apporportioners, I, II and III, all driven by the one pulley, X (usually tight and loose pulleys), and three stationary, concentric receptacles, R₁, R₂ and H, so constructed that any material falling into them will pass out through the spouts T₁ and T₂ into the sample buckets Z₁ and Z₂, or through the spout S, which discharges the rejected portion of the sample. Apporportioners I and III revolve in the same direction; I at about 5, II at about 15, and III at about 45 revolutions a minute. That is to say, each apporportioner moves actually three times as fast as the one above it, and in the contrary direction, or, relatively, four times as fast. By the use of this expedient of contrary revolution the same relative speeds are obtained as though, all revolving in the same direction, the actual speeds were respectively 5, 25 and 125, at which latter speed centrifugal force would become very troublesome.

The upper apporportioner, I, consists of two concentric rings, divided by eight partitions into eight equal topless and bottomless compartments, L, from each one of which leads an adjustable spout, either as M₁ or as M₂, or as MD. Set in rotation, spout M₁ would describe a certain circular path, 1 1; spout M₂ a certain other path, 2 2, and spout MD a third path, W (see Fig. 3).

The intermediate apporportioner II is merely a conical funnel, having, besides the large outlet W, four vertical shoots, N₁, N₂, N₃ and N₄, through its sloping sides, as shown in Fig. 3; each one of these shoots forms one eighth of the circular paths covered by the spouts M₁ and M₂, respectively.

The lower apporportioner III is of the same construction as II and bears the same relation to it that II bears to I.

The Bridgman sampler now at work in the Chicago Copper and Refining Company at Blue Island, Ill., is placed directly under the crusher. The samples are delivered into two bins on the lower floor and the "discard" goes direct to an elevator. Forty thousand pounds have been put through this machine in one hour and a correct sample taken, and a building 16 feet square and two stories high is ample room for sampling this large amount. From the head of the elevator the ore can be run into bins or spouted directly into cars for shipment, the only hand work required being to get the ore from the car to the crusher.

All the ore passes through the sampler and duplicate samples are taken. This is an important feature, and one of the strongest safeguards against errors or fraud. The skill and faithfulness of the workmen are not factors in the correctness of the work, as the machine is automatic and must give a correct duplicate sample of every pound that is fed into it.

The saving in the first cost of building will more than pay for the "sampler" where any considerable amount of work is to be done. With a proper arrangement of tracks to get the greatest economy in unloading and loading cars, an actual cost of less than 25 cents per ton will give correct

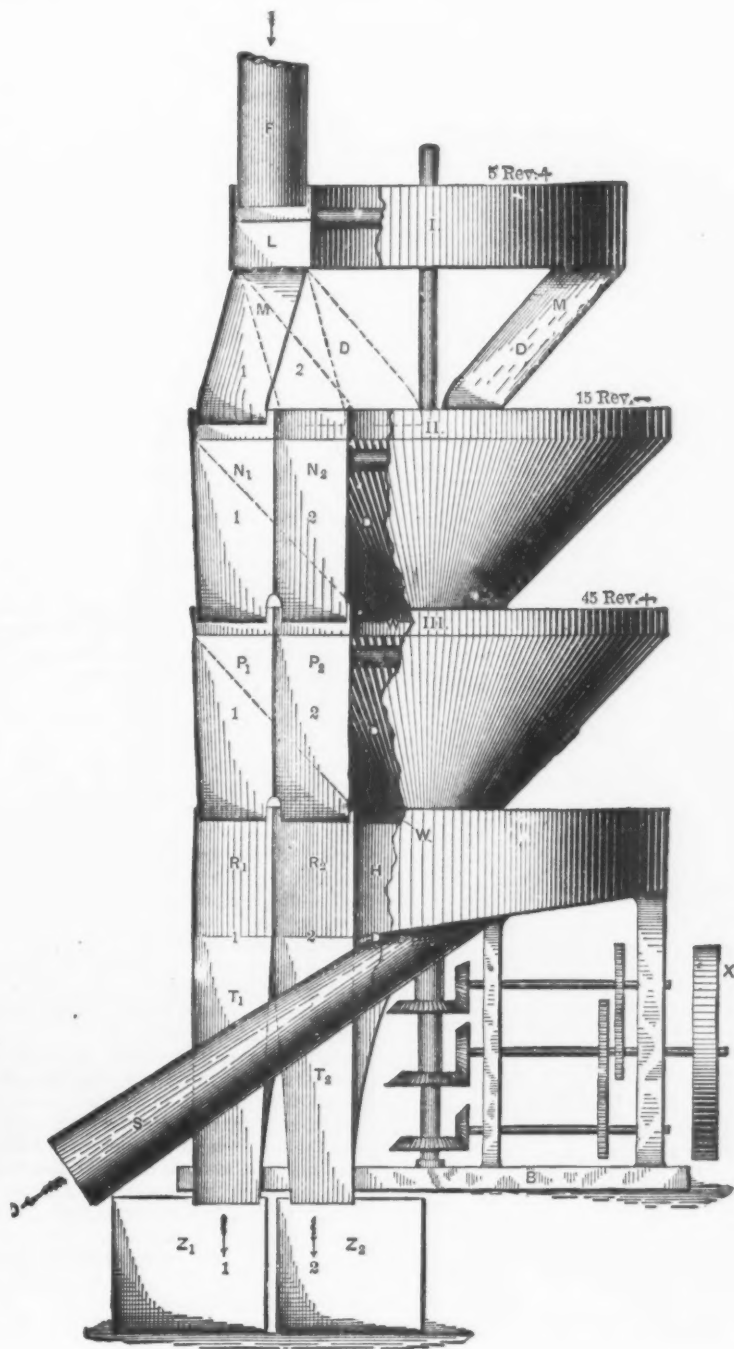


Fig. 2.—Elevation of Sampling Machine.

THE BRIDGMAN ORE-SAMPLING MACHINES.

9. It is entirely self-contained, and very compact.

10. It may be carefully and fully inspected while at work, without the necessity for the near approach of any person, so that the most suspicious ore seller may easily assure himself of the fairness of the operation.

11. It may be thoroughly cleaned by one man in 15 minutes or less, and, if desirable, may be washed out with a water hose.

12. It may be inclosed in a dust-case. This, however, is rarely necessary, as it is usually better slightly to moisten dry ores

13. It is very inexpensive, both to operate and to maintain, the total cost of sampling with this machine being only about one-tenth that of hand work. It is provided everywhere with ball bearings and graphite bushings, which require practically no lubrication (with its accompanying dirt and annoyance) and make it possible to run the machine with much less power than may be continuously exerted by one man. All parts exposed to wear are heavy, while ample provision is made for repairs, duplicate parts being readily obtainable.

14. It is preferable to crush the material

duplicate samples of ore or matte, including the whole expense of unloading and reloading the cars. At the Chicago Copper Refining Company's works the ore is wheeled on scales in barrows, elevated to the crusher and fed in by hand, and the total cost of getting a correct duplicate sample is an average of only 24 cents per ton. From the records of regular work being done at the Chicago Copper Refin-

The machine samples of car 5416 weighed 600-664 pounds and assayed as above. The whole was fed through the crusher by one man shoveling in six hours and was crushed to about $\frac{1}{4}$ -inch size. To check on the machine samples the "die-card" was run on to the lower floor and shoveled to the elevator by one man, cutting out $\frac{1}{10}$ for each hand sample. Each hand sample weighed 4800 pounds, and

The Rock Drill Applied to Opening the Tapping Hole of a Blast Furnace.*

BY DAVID BAKER, SPARROW'S POINT, MD.

Devices for saving labor in immediate connection with the operation of the iron blast furnace have received comparatively little attention. Machines for hoisting and blowing, always employed in some form, have been improved, but charging, tapping, casting and handling the pig iron in the beds are still performed chiefly by manual labor. At almost all furnaces filling is done with the handbarrow of 25 years ago, and it is only recently that here and there chills have been employed in the cast house instead of the usual sand beds to lessen the labor of handling the pig, as well as to secure its greater purity.

The manual labor of opening and closing the tapping hole has been, so far as I know, rather increased than diminished. The enlarged hearths and greater capacity of the modern furnace render it more difficult to "keep the tap hole back," as furnacemen say. In the old-fashioned smaller furnaces, the slacking of the blast pressure and the introduction of a single ball of clay, involving (for closed fronts) an average stoppage of not more than three minutes, sufficed for plugging the hole, and opening it was correspondingly easy. No care was taken in the selection of material for the purpose, ordinary brick clay being found sufficiently refractory. At present fire clay, mixed with graphite, is sometimes used, or the material of old black-lead crucibles is rammed in with balls of clay, and instead of one ball a wheelbarrow load is often required. Indeed, in "putting in a new hole," three or four barrows of clay balls, with a barrow of fire brick, may be required. To make a large hearth safe against "break outs," the clay stopping should be "kept back" 3 feet from the outside of the tap hole.

To open at casting time one of these deeply and thoroughly stopped iron notches requires the labor of eight or ten men, drilling with a heavy bar for from ten to thirty minutes, sometimes even 60 minutes, according to the condition of the furnace. This work is exhausting, and it is usual to call the men from the stock house to assist in opening the hole, as well as in special work in the cast house, while the iron is running. Probably the main reason for the general absence of attempts to diminish the manual labor at the tapping hole has been the presence of a large number of "fillers" available at casting time for work before the furnace. But, on the other hand, this extra work imposed on the fillers has stood in the way of a reduction of their number.

At the blast furnaces of the Maryland Steel Company, the adoption of a new system of furnace charging rendered it practicable to reduce the labor required for filling; and the contemplated delivery of the molten iron direct to the Bessemer converter would reduce the labor needed in connection with casting. But to secure the full advantage of both these improvements, it was necessary to do away with the requirement of many workmen for hand drilling at the furnace front. This consideration led to experiments with the percussion rock drill as a tap-hole opener.

The first trial was made in the autumn of 1890. The drill employed was the Little Giant, No. 4, of the Rand Drill Company, a somewhat heavier machine than is usually adopted for work in rock. It was mounted on the regular swivel base, clamped to a horizontal bar, which was swung from a column as a crane. The

* Read at the Schuylkill Valley meeting of the American Institute of Mining Engineers.

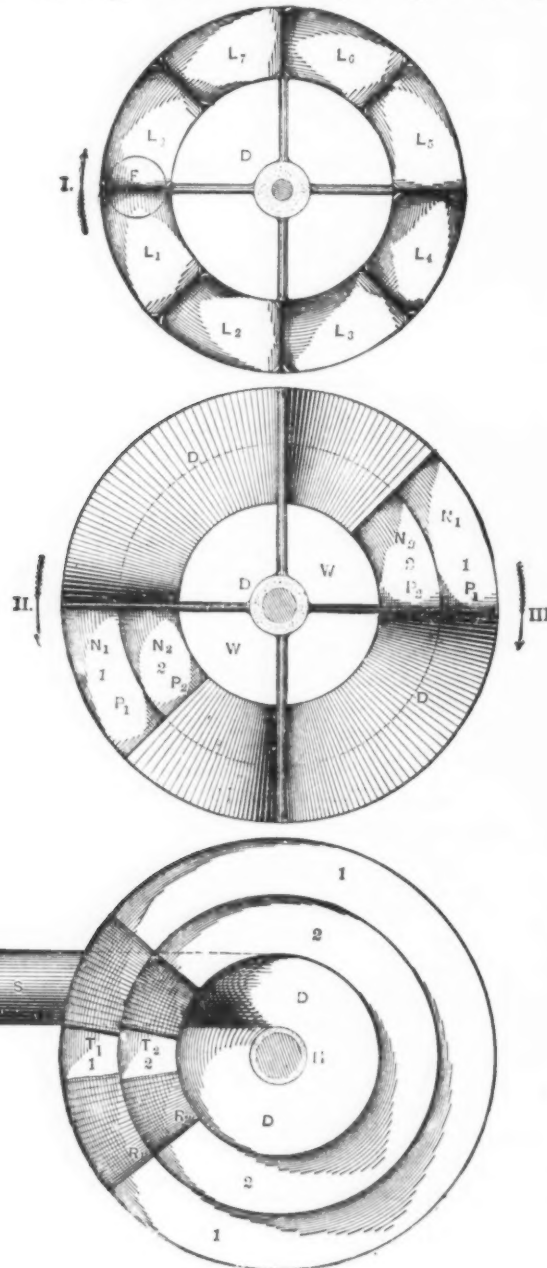


Fig. 3.—Plan of Apportioners.

THE BRIDGMAN ORE-SAMPLING MACHINES.

ing Company's works we append the following:

Material—Copper Matte.

Giving assays from hand samples sent in by the consignor, and from the Bridgman sampler, with a second hand sample of one car made as a check on the Bridgman sampler.

was cut down in two and a half hours by two men, four cuts to each, to 329-352 pounds.

	Hand sample.		Per cent. Cu.
	Oz. Au.	Oz. Ag.	
Car 5,416.....	(1) 0.25	68.7	62.4
	(2) 0.25	68.9	62.4
Average.....	0.25	68.8	62.4

	Their hand samples.			Contents of lot.		
	Oz. Au.	Oz. Ag.	Per cent. Cu.	Oz. Au.	Oz. Ag.	Pounds Cu.
Car 5,385..	(1) 0.24	69.7	62.3	9,430	3,289.46	58,852
Car 5,416.....	(2) 0.20	69.7	62.4			
Average.....	0.20	69.7	62.35			
Each car was sampled separately through the Bridgman sampler.						
Car 5,385, 64,598 pounds.....	(1) 0.25	69.6	62.4	5.825	1,623.60	20,077
	(2) 0.25	70.2	62.4			
Average.....	0.25	69.9	62.4			
Car 5,416, 47,701 pounds.....	(1) 0.25	69.6	62.4	5.974	1,606.71	20,798
	(2) 0.25	69.9	62.3			
Average.....	0.25	69.70	62.35	11.799	3,230.31	58,875

difficulties with this mounting were the short feed, and the long time required to withdraw the bit, after the hole had been drilled.

We modified this arrangement by increasing the radius of the crane on which the drill was clamped, and by simplifying the fastening, so as to permit a quicker removal. The result, however, was still unsatisfactory. We burned too many bits.

The present method of mounting, described below, has been entirely successful. The feed is long enough to enable the bit to penetrate through the clay stopping in all cases; and the bit can be retired instantly without danger to it. In case of a very "hard" hole, the withdrawal may be made frequently, and the bit may be cooled in water without greater loss of time than in hand drilling.

The feeding is accomplished by a cylinder containing a piston and rod attached

steam to pass from the front end of the cylinder to the drilling machine. L is the hollow piston rod connecting with the valve chest of the drill by means of a steel tee and pipe, *b*.

M is a friction clamp shown in detail in Fig. 2, which grips the piston rod and thus may be used to regulate feed.

The machine may be counterbalanced by weights so as to be easily pushed up by hand when not in use; or the chains may be attached to the piston of a hydraulic or steam cylinder.

While in use the frame stands as shown in Fig. 1; A (an elevation), the angle depending on the condition of the hearth of the blast furnace.

The operation of tap hole drilling is as follows: When it is time to cast, the frame is lowered to the right position; steam is admitted; and the three-way cock is turned as shown in Fig. 3. The effective

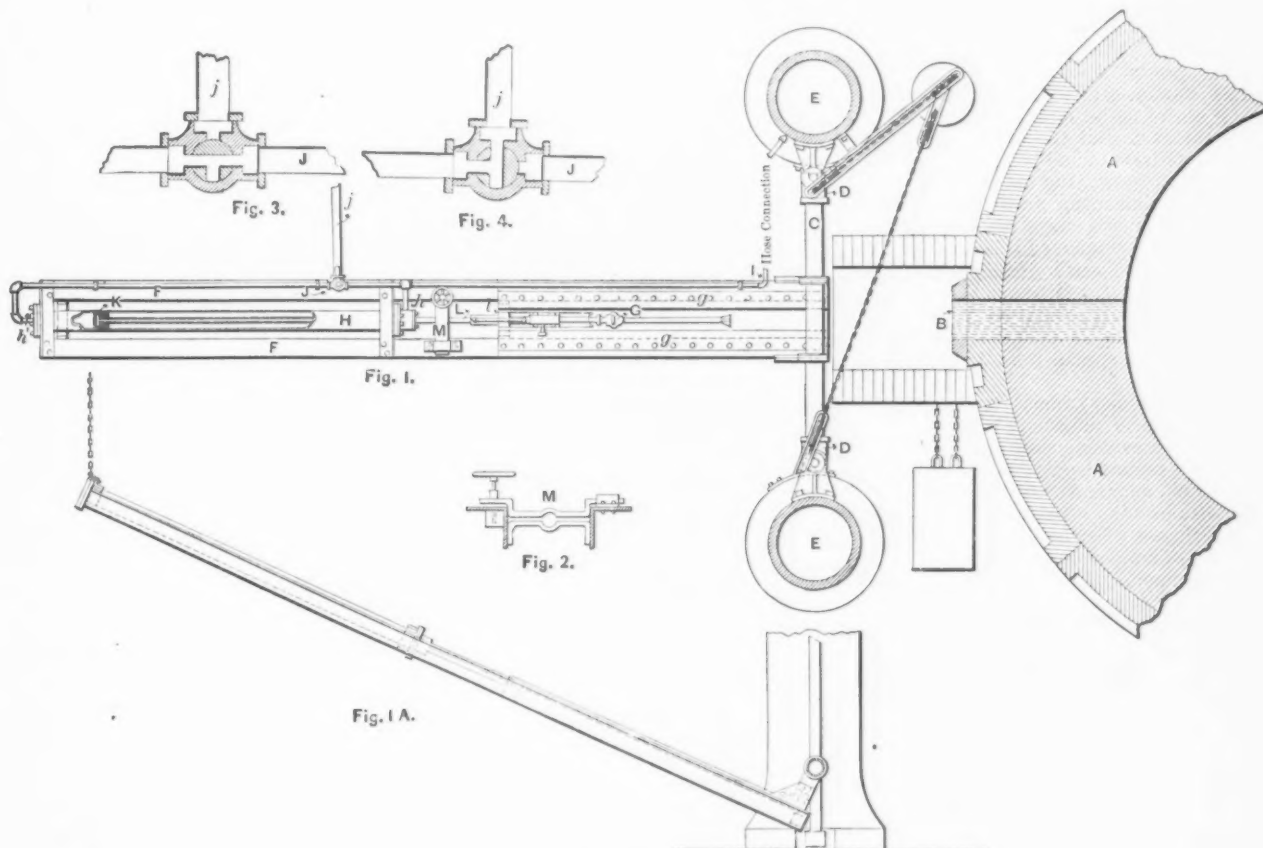
hole; that is, more nearly a true circle. We have found that this tends to make the tapping hole stand longer against cutting out by the hot iron and cinder.

2. The percussion drill itself is useful for other purposes. Even when the furnace is out of blast it can be mounted on a tripod and employed, to the saving of much time, in drilling the salamander.

3. The most important saving, however, is the labor before the furnace—the "helpers."

Since the adoption of the steam drill we have been able to save one man at each turn, or two men a day; and we expect, as soon as the pig metal is all taken direct to the Bessemer converter, to make a greater saving than is apparent now.

The once famous gossan lead of Virginia is losing much of its glory. The



MOUNTING OF ROCK DRILL FOR OPENING BLAST-FURNACE TAPPING HOLE.

to the drill where the usual feed screw is fastened. The piston rod is hollow, and serves both to feed or withdraw the drill and as a channel conveying steam to the operating cylinder.

In Fig. 1, A is the section of a part of the hearth of the blast furnace; B the tap hole, and C a cross bar arranged with guides to slide on vertical bars attached to the columns E. F is the frame, consisting of two parallel angle bars attached to the horizontal cross bar C. G is the drilling machine, which travels in suitable guides bolted to the angle iron frame. H is the feed cylinder, made of wrought-iron pipe, bored out, or of brass pipe, which does not require boring. I is the supply pipe, which is connected with the pipe at the column by hose or by wrought iron pipe provided with swivel joints. One branch of the supply pipe I connects with the front head of the cylinder at A; the other with the back at A'. In the branch leading to the back of the cylinder is placed a three-way cock, J. K is the piston of the feed cylinder, axially cored to allow

pressure in the rear of the piston being greater than that in the front, the drill is fed up to the work, but is prevented from going too far by the clamp M. A cock in the valve chest of the drill is now turned, and the drilling is begun. The feed may be controlled by the friction clamp.

As soon as the melted iron is reached, the friction clamp is loosened and the three-way cock is turned into the position shown in Fig. 4, thus allowing the steam to exhaust from the rear end of the feed cylinder. This removes the bit from tap hole at once, and the tap hole being open, the machine is pushed up about 10 feet out of the way.

In practice we have found it necessary to put a spring in the rear end of the feed cylinder to take the shock from the head in case the piston should be allowed to go back so fast as to become uncontrollable.

The advantages of the power drill over the old hand drill are:

1. It is much quicker and cuts a better

ore shipped has been running so lean of late that one after the other of the Virginia blast furnaces has thrown it out of its mixtures. On the other hand, Ducktown, Tenn., gossan is appearing in the stockhouses of Virginia furnaces.

Last week 32 steel workers left Knoxville, Tenn., for the Homestead Steel Works. They were all white men and claimed to be thorough workmen. They had gone South when the iron industry was on a boom in Alabama and Tennessee and had worked at Sheffield, Birmingham and Knoxville, but on account of the depression in the iron trade they had been out of work for several months. They state that a number of steel workers who went South are anxious to get back to the North.

The Northern Pacific Steamship Company are now fully equipped as a first-class passenger and freight line, to operate in conjunction with the railroad between Tacoma and Chinese and Japanese ports.

Random Shop Notes.

A recent visit to the Builders' Iron Foundry of Providence, R. I., and a trip through the establishment revealed many machines and processes of unusual interest. As our readers are well aware, one of the principal works carried on here, independent of the regular foundry operations, is the manufacture of 12-inch cast-iron steel-hooped mortars for the Government, and also the carriages for the mortars. In general, the mortar carriage, which we trust to be able to describe very fully in an early issue, consists of a couple of heavy circular bed plates, upon which it is necessary to perform considerable turning for the tracks. This is accomplished by means of a boring mill made in the establishment, and almost wholly out of material on hand that was of little or no use. The center plate consists of the face plate of a large lathe and is held in position by I-beams extending to a circular rack which was cast in segments. Engaging with this circular rack is the driving pinion operating the table. A simple device, also picked up about the shop, serves as a tool carriage, which, while not having all the various feeds now thought desirable in a boring mill, has sufficient for fully carrying out the work here in hand. Extending vertically through the center of the face plate is a long spindle, whose upper end is held by a V-shaped frame extending from one of the upper floor beams. Although the machine is crude to look at and limited in its capacity, it has been found to be admirably adapted to this special work for which it was designed.

In another department we noticed a lathe having an unusually long bed, and on which provision had been made for utilizing a certain length of the tail stock end, which, a large part of the time, would otherwise be idle. Mounted on this end, and serving as a head stock, was the driving head of a pipe threader. This, together with a temporary foot stock, which could be placed at any desired distance between the pipe threader and the original head stock of the lathe, served every purpose and permitted the utilization of the tool at all times when the work was of such length as to come between the centers.

In the main machine shop is a large planer, which was at first driven by quarter turn belt from an overhead shaft, and as usual much trouble resulted. By the substitution of ropes and V-shaped driving and driven pulleys all difficulty has been obviated and the planer run to far better advantage than it ever was with a flat belt. On one part of this belt hangs a tightening device, consisting of a weighted pulley. The most important point connected with this is that this pulley serves to correct the tendency of the V shaped pulleys to change the true circular section of the belt. The idle or tightener pulley having a semi-circular groove, the others, as stated, being of V-shaped, the rope has been found to keep its true original section, and, in addition, to last much longer than it first did.

A peculiar problem was presented in the overhead traveling crane in the foundry. There was not enough room between the top chords of the girders of the bridge and the roof rods to permit of the introduction of a crane having the usual trolley and operating mechanism placed on the top. F. N. Connet, the chief engineer of the works, therefore designed and now has in operation an electrically driven crane, in which the machinery for traveling the crane, traveling the trolley and hoisting is placed between the girders and beneath the top chords. Three motors are employed, and on the shafts are fiber pinions, which have been found to work noiselessly and to be very durable. Other im-

provements have been made in this mechanism which at the present time we are not at liberty to describe in detail.

Our readers are well aware from what we have said in our articles on the manufacture of steel-hooped guns that the shrinkage operations are always accompanied by more or less anxiety on the part of those in charge. This is caused by the fact that the clearance between the heated hoop or jacket and the part over which it is to pass is extremely small, and that any distortion in the hoop from a true cylindrical cross section or any variation in what we might call its alignment would result in the binding of the hoop before it reached its proper place. As this would cause great expense and would require much time to correct, the operation is always done with the greatest care. A short time since, while putting on one of the breech hoops on the 12-inch mortars made by the Builders' Iron Foundry, the hoop stuck when it got within about 6 inches of the hoop already in position. It had been passed over the breech end of the gun. Of course, before it was possible to separate the gun and hoop, the latter had cooled sufficiently to so firmly grip the barrel as to prevent its removal by any application of mechanical force. The question then coming up was whether to remove the hoop by turning or to attempt some way of getting it off without injuring either it or the gun. A very simple method, quickly performed and costing but an insignificant amount, was resorted to and the hoop and gun were separated without the least injury to either. A bar was placed through the bore of the gun, and from a hook on one end it was swung, muzzle end up, from the overhead crane. Around the lower end of the gun was then placed a mold in such form that cast iron could be flowed around the center of the stuck hoop a thickness of some 4 or 5 inches, and for a height of about 10 or 12 inches, suitable gates and overflows being provided. In order that this would not form a perfect ring of cast iron about the hoop, it was divided by core pieces into three equal segments. The cast iron was then flowed in, and in about 10 or 12 seconds it had sufficiently heated the hoop to expand it so that the gun could be drawn out without any trouble. As a chain had been previously placed about the lower part of the hoop and connected with a hoisting apparatus, the hoop was then lifted out of the mold, when the cast iron segments fell off. This method of removing the hoop was also the happy thought of Mr. Connet, and the method pursued by him will certainly be read and appreciated by those connected with work of a similar character, especially at the Washington Navy Yard and Watervliet Arsenal.

There is, in the manufacture of these mortars, much measuring required. The outside measurements are made with wooden calipers, one leg of which is provided with a micrometer screw. It was found that two men would not reach the same results, and that the measurements of the same man would vary on different days. To overcome this difficulty and eliminate the "personal equation," a very simple method was pursued. The current from an electric battery was led to the gun and to the micrometer screw, the latter completing the circuit when it was brought in contact with the gun. In the circuit was a bell. It was found that the most accurate results could be obtained by this means, and that there was no discrepancy in the measurements of different persons. The bell gave notice the instant the screw touched the gun.

It is announced that the Newport News Shipbuilding Company will soon turn out from their establishment two new steel

steamers for the Morgan Steamship Line. One of them has been designated "El Rio." The second vessel is still known as No. 6. The new ships will maintain a seaspeed of 16 knots per hour. This speed, it is calculated, can be obtained on 3800 horse-power. Their principal dimensions are: Length over all, 406 feet; beam, 48 feet, and molded depth, 23 feet 9 inches. Each ship will measure in gross tonnage 4600. They will have triple-expansion engines and two steel masts.

The Mesaba Iron Range.

In the early days of the discovery of this remarkable region, I was profoundly impressed with the magnitude of the ore deposits which were found *in situ*, and at that time wholly undeveloped. I was in company with Prof. N. H. Winchell, the State Geologist of Minnesota. The expectations then aroused have since been more than realized, while the promise of an immense output in the immediate future is accentuated by the report of Professor Winchell's son, his assistant, which has just been published. As the testimony is given *ex cathedra*, it has weight, and will therefore be accepted with confidence by those who read it. The substance of Mr. Winchell's statement is that good ore exists in the Mesaba range in great abundance, and it will be able to compete successfully with ore from other districts in the principal markets of the world. So far the number of paying properties exceeds a score. A larger area of ore-bearing territory and a larger number of mines have been found in township 58-17 than in all the rest put together. There are now a dozen good properties there, and it is quite improbable that the full quota is reached. Townships 58-16 and 58-18 are very rich in ore, too, but there have not been facilities sufficient to explore one-half the territory yet. Portions of it have been found too low and swampy for the ordinary methods of prospecting, but as soon as the extension of the Duluth, Mesaba & Northern Railway is completed the problem will be solved.

Mr. Winchell declares that "it is impossible to estimate the great activity and industry which must arise in this vicinity within the next year or two. . . . The northern part of the State will be more thickly populated within a single decade in consequence of these wonderful discoveries than it would otherwise be in a century. . . . There is scarcely any limit to the advantages that may be derived by the State at large from these tremendous deposits of high grade ore. . . . The fruits of the industry of the last six months will soon appear before the world. . . . There is an immense deposit of ore running southwest in sections 9, 8, 17, 20, 30 and 31 in town 58, range 17. On this ore belt are located the Wyoming, New England, Mesaba, Mountain, Lone Jack, Ohio, Virginia, Rouchleau, Security, Great Western, Iron King and Parkersburg Companies. In some pits this ore exceeds 100 feet in depth. In others the depth is not known. It is largely a high-grade Bessemer, and is soft, with a red-blue or black color. It is found beneath 5 to 40 feet of gravel, sand and clay. It is safe to say that there are millions of tons of ore on these properties. Millions of tons: the significance of those figures will be better realized when it is considered that all the mines on all the other ranges in the Lake Superior district have produced only about 65,000,000 tons during the past 36 years. Nearly 200 mines worked at various intervals for more than one generation, and constituting the greatest iron district of the world, have produced less ore than has been discovered on the Mesaba range in one year."

As to quality, there are pits of ore in this new ironclad district which cannot be

excelled in any mine in the country to day. The ore is so clean and rich and so soft and easily mined that it beats anything known in the world at the present time. One example may be given of a pit recently sunk on the Iron King property on the northwest forty of section 20, 58, 17. At the depth of 19 feet soft blue-black ore was encountered, which assayed 66.50 per cent. in iron and 0.031 phosphorus. This sample was taken but 1 foot below the sand and gravel covering. At the depth of 45 feet this pit was as pretty a sight as could be seen. There is every prospect of a large body of excellent ore here. Other pits in the same vicinity on other properties make a similar showing. Such ore as this will make the reputation of the range.

Obviously, the history of Minnesota as a mining and manufacturing State is destined to be conspicuous. The great desirability of furnaces within her limits cannot be too earnestly urged, especially as the mines are easy of access by the new railroads which have been built. An intelligent examination of these mines will convince any one that they are as numerous and generally as extensive as they are claimed to be.

The disclosure of this immense body of iron was made only last fall by a couple of hunters who accidentally discovered a rich exposure of ore in a cavity made by a large uprooted tree. The deposit is apparently unlimited, as proven by test pits which have been dug all over an area embracing many townships. It lies within 6 to 20 feet of the surface, is soft and at present is being taken out with steam shovels. It yields from 66 to 71 per cent. of iron per ton, which makes one ton worth two of any other mined elsewhere, and it can be obtained at less expense than any other ore. Millions of tons have already been contracted for by Pittsburgh and other parties. The Biwabic Mine, a tract of 160 acres owned by Lon Merritt, the president of the Mesaba & Northern Railroad, is the most extensive yet discovered, and \$3,000,000 have been refused for it. The owner claims to have 20,000,000 tons of ore, and this can be shipped at a profit of \$1 per ton, no matter how cheap iron may get to be. The first train of ore cars went through from Duluth on October 17, and will bring down a load of iron. It is predicted that there will be an excitement and unprecedented stir over these developments within 60 days.

Professor Winchell has prepared a physical chart showing the exact location of actual finds.

CHARLES HALLOCK.

The Colorado Consolidation.

On October 20 the stockholders of the Colorado Fuel and Colorado Coal & Iron Companies met in Pueblo, Col., and ratified the recommendations of the respective boards of directors effecting a consolidation. The name of the new company is the Colorado Fuel & Iron Company.

Eighty-five thousand shares, or 85 per cent. of Colorado Coal & Iron stock, and 46,000 shares, or 92 per cent. of Colorado Fuel stock, were represented. The vote of both companies was unanimous. The directors and officers of the new company are as follows: Directors—Henry R. Wolcott, Dennis Sullivan, W. H. James, J. L. Jerome, C. H. Toll, J. A. Kebler, J. C. Osgood, all of Denver; Paul Morton of Chicago; W. L. Graham of Pueblo; E. J. Berwind, Ernest Thalman, H. K. McHarg and C. F. Meek of New York; J. C. Osgood, president; Henry R. Wolcott, first vice-president; Paul Morton, second vice-president; J. A. Kebler, third vice-president; C. M. Schenck, secretary; A. C. Cass, treasurer.

The Brooks Compound Locomotive.

We here present drawings of the compound locomotive built by the Brooks Locomotive Works of Dunkirk, N. Y., which for some time has been in service on the Lake Shore & Michigan Southern Railroad. It was constructed in accordance with patents issued to John Player. The engine has been most successful in every respect, has shown marked economy in the use of fuel, steadiness in running and high speed.

The objects of this design are, 1, to automatically reduce the pressure of the

two ends of the receiver so that the exhaust steam from the high-pressure cylinder may flow direct through the receiver into the low-pressure steam chest and act upon the low-pressure piston; third, to provide means whereby the engineer can at all times obtain complete control of the engine in the same manner as a simple engine when switching, running on turn tables, &c.

These objects are attained in the following manner: First, by introducing into the receiver pipe or steam passage between the high and low pressure cylinders a combined admission, pressure-regulating and intercepting valve, which immediately

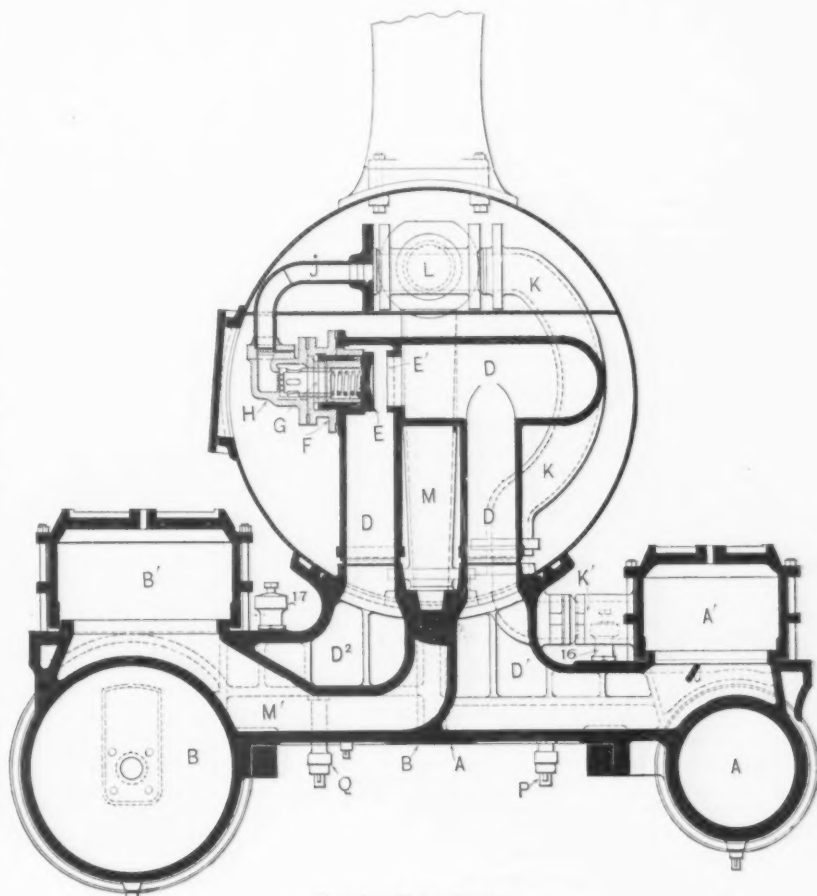


Fig. 1.—Cross Section.

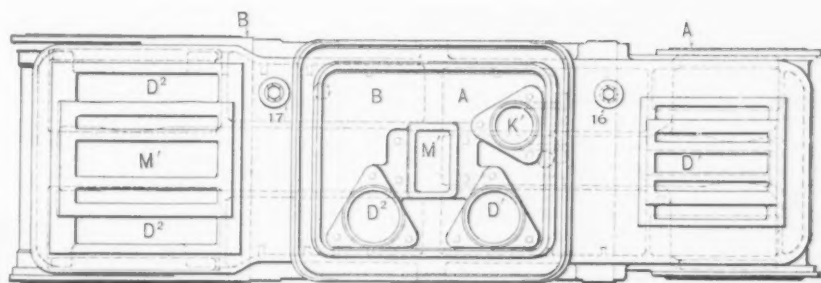


Fig. 2.—Plan.

THE BROOKS COMPOUND LOCOMOTIVE.

live steam admitted to the low-pressure cylinder, so that the mean effective pressure on the low-pressure piston at starting may be equal to that on the high-pressure piston or be regulated in any desired ratio, and to automatically regulate this supply of live steam at reduced pressure to the low-pressure cylinder, and to prevent this pressure from working against the back of the high-pressure piston; 2, to automatically cut off the supply of live steam to the low-pressure cylinder at a period when the pressure in the high-pressure side of the receiver is the same as that on the low-pressure side, and to simultaneously open connections between the

upon opening the throttle valve or regulator admits live steam at reduced pressure to the low pressure cylinder, this pressure being regulated in such ratio as desired, the intercepting valve at the same time automatically closing, preventing the live steam pressure from working against the high-pressure piston, the reducing valve remaining open until such time as the pressure in the receiver pipe on the high-pressure side of the intercepting valve becomes equal to or slightly in excess of that on the low-pressure side, when, secondly, the pressure-regulating valve closes automatically and the intercepting valve opens

simultaneously, the first cutting off the supply of live steam to the low-pressure cylinder, and the second opening connection between the two ends of the receiver and allowing the high-pressure exhaust steam to act directly on the low-pressure piston, and at the same time locking the pressure-regulating valve upon its seat and preventing the further admission of live steam to the low-pressure piston. These valves remain in this position during the time the throttle valve is open, but are automatically opened as soon as the steam is shut off, and remain so until the throttle is again opened, when the above described operations are repeated.

Referring to Figs. 1, 2 and 3, A is the small or high pressure cylinder and saddle, and B the large or low-pressure cylinder and saddle, of a compound engine, arranged on opposite sides of the locomotive and connected together in the same manner as cylinders of single-expansion engines. A' and B' are the steam chests of the respective cylinders. C is the smoke box. D is the receiver pipe and superheater, located in the smoke box and connected at one end to the exhaust port of the high-pressure cylinder through the passage D' and at the other end to the admission ports of the low-pressure steam chest through the passage D². These passages, D' and D², are purposely enlarged to the full area of each cylinder saddle in order to obtain the greatest amount of receiver capacity possible. The casing F of the intercepting valve E is located in the receiver pipe D. G is the pressure-regulating valve, and H is its casing. The valve G works within the intercepting valve E. J is the high-pressure steam pipe, connecting with the T-head L, through which high-pressure steam is admitted to the pressure-regulating valve G. K is the steam pipe, connecting with the T-pipe L, through which steam is admitted to the high-pressure steam chest A'. M is the exhaust pipe, connecting with the exhaust passage M', in the low-pressure cylinder saddle. The controlling valves are ordinary flat valves working in their respective casings P and Q, operated by the slotted rods R and S, connected to a suitable lever in the cab by the lever T. The valve P is attached to the bottom of the receiver D' on the high-pressure side, and the valve Q is attached to the bottom of the receiver D² on the low-pressure side of the intercepting valve.

Figs. 4, 5 and 6 show an intercepting valve, E, within its seat, E', and casing, F, which has working within it a pressure-regulating valve, G, in its casing or chamber, H, to which is connected the high-pressure steam pipe J. This intercepting valve is shown of the disk type, with an annular projection, 1, forming a balancing device fitted with packing rings, 2, and having slots or passages, 3, through which the high-pressure steam passes into the receiver on the low-pressure side. The pressure-regulating valve G is an ordinary-type plug valve, having hollow extensions, G² and G³, of different external areas, fitted with packing rings, 4 and 5, working in its chamber, H, and in the interior of the annular extension of the intercepting valve respectively. This valve is provided at its smaller extremity with passages, 6, through which the high-pressure steam is admitted into the interior of the valve and allowed to operate on the large end G³, thereby reducing the pressure in proportion to the area of the part G³ to the part G². The large end of this valve is provided with a seat, G⁴, which, when the intercepting valve opens, forms a steam-tight joint with the similar seat E⁴ on the intercepting valve, thereby allowing the whole area of the intercepting valve to become operative upon the reducing valve, keeping it closed when the pressure in the receiver D is considerably

below the pressure which would be required to keep the reducing valve closed on account of the difference in areas of the valve itself, or, in other words, the excess of area of the intercepting valve is utilized to secure an increased difference in areas between the large and small ends of the reducing valve, thus keeping it closed under a lower pressure than is necessary for starting the locomotive. The travel of the pressure regulating valve is limited by a stop pin, 7, which passes through a slot, 6, in the valve, thereby preventing the pressure-

and having an opening, 34, connecting with the atmosphere, as shown in Fig. 4. The casing is screwed into the leakage hole 8 and is used to prevent the too rapid closing of the intercepting valve E when steam is admitted through the pressure-regulating valve G. It also serves to prevent the chattering of the intercepting valve when running without steam. The pressure-regulating valve shown is provided with a stiff spring, 9, of known capacity, which operates against the large area of the valve and is intended to keep the valve off its seat at all times when the

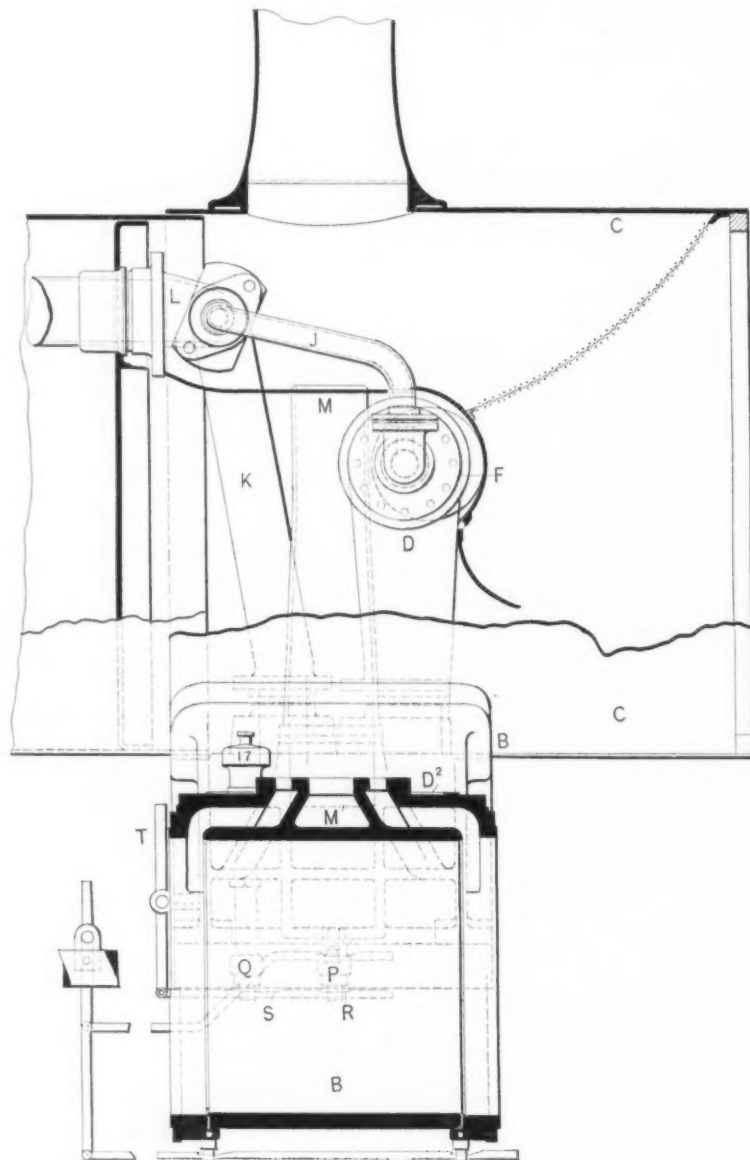


Fig. 3.—Longitudinal Section through Low-Pressure Cylinder.

THE BROOKS COMPOUND LOCOMOTIVE.

regulating valve from having the full travel of the intercepting valve and also preventing the pressure regulating valve from closing on the seat E⁴ of the intercepting valve when the intercepting valve itself is closed, so that the full area of the passages 3 in the intercepting valve E may be utilized for the passage of the reduced-pressure steam into the receiver on the low-pressure side. The intercepting-valve chamber F is provided with a leakage hole, 8, whereby the differential areas of the intercepting valve and of the pressure regulating valve may at all times be exposed to the atmosphere in order to secure their proper working. This leakage hole may be provided with a check valve, 31, working in its casing, 32, and held to its seat by the spring 33

throttle is closed. The valve E is also provided with a spring, 10, of less capacity than the spring 9, which operates to keep the valve E against its seat E' at all times when the engine is at rest.

These improvements consist in the combination with the high and low pressure cylinders of a compound locomotive, and with the receiver pipe or passages, of a combined intercepting and pressure-regulating valve arranged as shown in the drawings, and so proportioned that upon opening the throttle valve live steam is admitted through the connecting pipe to the pressure regulating valve, causing the same to open. The steam then passes through the hollow extension of different external areas and causes the intercepting valve to close. The steam then acts upon

the enlarged end of the pressure-regulating valve, causing a reduction of pressure in proportion to the relative areas of

pressure piston as soon as the slide valve opens the admission ports, thus enabling the engine to start with the

slightly in excess of the reduced live-steam pressure on the low-pressure side. The intercepting valve then automatically opens connection between both ends of the receiver and seats itself on the enlarged end of the pressure regulating valve, thus giving this valve an increase of area on its large end and causing it to remain seated against the full pressure of the live steam in the connecting pipe at a considerable reduction of pressure in the receiver from the original pressure used in starting the locomotive. The intercepting valve, however, contrary to the action of other intercepting valves hitherto introduced, does not leave its seat at the first exhaust from the high-pressure cylinder, but remains seated until the pressure in both sides of the receiver is approximately equal, thus preventing any sudden reduction of pressure in the low-pressure cylinder and consequent loss of power.

The controlling valves are provided in order to give the engineer full control over the operations of the locomotive at all times, especially when moving the engine a few feet in either direction, as is frequently necessary. These valves, as previously described, are attached to the under side of the receiver, one on the high-pressure and the other on the low-pressure side of the intercepting valve. They may, however, be attached to the receiver or passages in any other location desirable. These valves are connected to a suitable lever in the cab of the locomotive. The engineer, when desiring to move the locomotive a short distance, moves this lever so as only to open the valve attached to the high-pressure side of the receiver. This valve is of sufficient area to allow the exhaust steam from the high-pressure cylinder to pass out into the atmosphere instead of accumulating in the receiver and finally causing the intercepting valve to open. While this valve remains open the locomotive is operated as a single-expansion engine, the whole amount of steam used in the low-pressure cylinder being admitted through the pressure-regulating valve. When the engineer wishes to stop the locomotive in any desired position without the use of brakes, he moves the controlling valve lever into its furthest position. This causes the valve on the low-pressure side of the receiver to open as well and allows the escape of any steam collected therein after the throttle valve has been closed, thus preventing any further movement of the low-pressure piston. These valves can also be used when starting to allow the escape of condensed steam from both sides of the receiver. The valves being of the shifting type, allow the admission of air to the receiver, and subsequently to the low pressure piston, when the engine is running with the throttle shut. This prevents the chattering of the low-pressure slide valve when running with steam shut off.

This locomotive operates as follows: When the engine comes to rest after running with the throttle shut, the intercepting valve, unless provided with springs, will be found open and seated against the pressure regulating valve, the pressure-regulating valve itself being closed, as shown in Fig. 4. When, however, the intercepting valve is provided with springs, it will be found closed against its seat and the pressure-regulating valve will be open, as shown in Fig. 5. These springs are simply provided to quietly return the valves to this position, in order to prevent slamming when steam is admitted. When the throttle valve is opened, live steam is admitted to the high-pressure steam chest through the steam pipe K and passages K' and operates upon the high-pressure piston in the ordinary manner. At the same time steam is admitted to the high pressure end of the pressure regulating valve through the connecting pipe

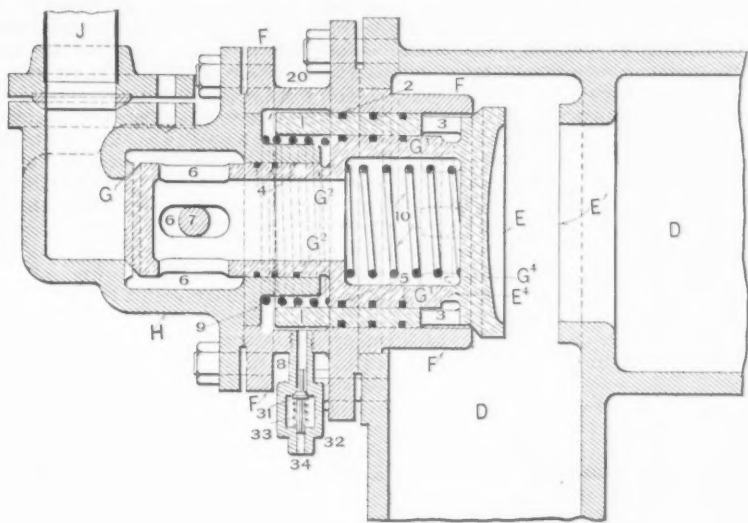


Fig. 4.

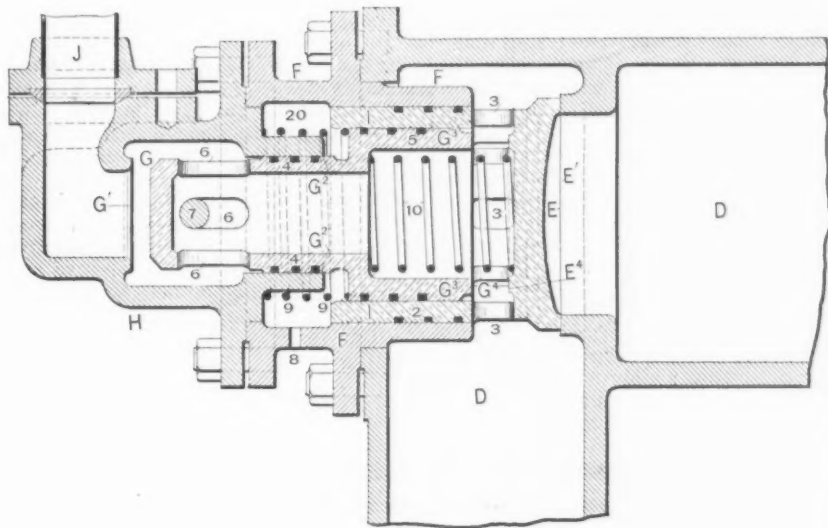


Fig. 5.

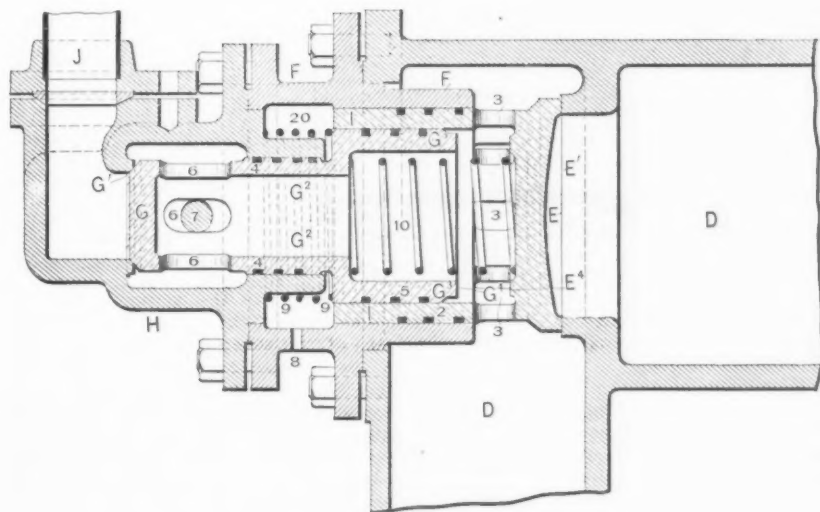


Fig. 6.

These Drawings Show the Intercepting Valve and Pressure-Regulating Valve in Different Positions.

THE BROOKS COMPOUND LOCOMOTIVE.

the two ends. This reduced pressure fills the receiver pipe and passages on the low-pressure side of the intercepting valve, also the low-pressure steam chest, acting upon the low-

cranks in any position in a similar manner to a single-expansion engine. This flow of reduced-pressure steam is kept up until the pressure on the high-pressure side of the intercepting valve becomes equal to or

J, causing the valve to open, and, passing through the slot 6 and thence through the hollow portion of the valve, causes the intercepting valve to close against its seat, as shown in Fig. 5. This steam flows through the passages in the intercepting valve into the low-pressure end of the receiver, and, acting upon the large end of the pressure-regulating valve, causes it to partially close as soon as the requisite pressure is obtained, and thereafter regulates the amount of steam admitted by the pressure-regulating valve, maintaining an even pressure in the receiver. The reduced-pressure steam thus admitted to the receiver acts upon the low-pressure piston in the ordinary manner. As soon, however, as the high-pressure cylinder has exhausted sufficient steam into the high-pressure end of the receiver to overbalance the intercepting valve, this valve opens automatically, at the same time locking the pressure-regulating valve against its seat (see Fig. 6). The exhaust steam from the high pressure cylinder flows through the receiver and acts directly upon the low pressure piston, the pressure of this exhaust steam, even when considerably reduced, being sufficient to keep the pressure-regulating valve closed through the action of the duplex valve at all times. As soon as the throttle valve is closed the intercepting valve and pressure-regulating valve assume the positions shown in Fig. 6, allowing the passage of air, a portion of which is forced through the receiver by the high pressure piston and the remainder induced through the controlling valve on the under side of the high-pressure end of the receiver. These valves remain in this position until the throttle is again opened, when the above described operations are repeated. It will thus readily be seen that with this improved combination live steam at a suitable working pressure is permitted to act upon the low-pressure piston at all times in starting, and that steam at this pressure is maintained in the low-pressure side of the receiver and prevented from working against the high-pressure piston until such time as the high pressure end of the receiver becomes charged with exhaust steam from the high-pressure cylinder at approximately the same pressure, whereupon the intercepting valve, acting in combination with the pressure-regulating valve, permanently cuts off any further supply of live steam to the low-pressure cylinder, and permits the direct passage of the exhaust steam from the high-pressure into the low-pressure cylinder. This combination also prevents live steam admitted through the pressure-regulating valve from passing into the high-pressure end of the receiver, and thus acting upon the back of the high-pressure piston.

The report of the Bureau of Statistics on immigration for the month of September, shows for the first time this year a falling off from last year's figures. For eight months ending August 31, 1892, the number of immigrants reported was greater by more than 30,000 than for the same period of the previous year. The August immigration this year was the same as last, about 45,000, but the September returns show a total of only 28,229, in comparison with 52,706 a year ago. For the nine months ended September 30 Ireland is credited with only 45,000 immigrants, against 49,000 from Sweden and Noway, 51,000 each from Italy and Russia, and 98,000 from Germany.

A prominent railroad manager states that if the demand were urgent 350,000 troops could be transported to New York within thirty hours by the four Western trunk lines and at the same time commercial supplies could be moved sufficient to meet the current needs of the country.

The Thomas Coke Oven.

The second number of the proceedings of the Alabama Industrial and Scientific Society contains a paper, by J. T. Hill of Coalburg, Ala., giving his experience with the Thomas coke oven at the plant of the Sloss Iron & Steel Company. We take from it the following:

The Thomas oven is not, as is generally believed, a modification of the Belgian oven altogether, as, except in similarity of shape and method of drawing the coke, it possesses none of the various arrangements incident to the application of heat, the saving of by-products, waste gases, &c., but it is more an improvement upon the old Welsh oven which is now, and has been for a great many years, largely in use in Wales and certain parts of England. The old Welsh oven is described in the books as "a simple rectangular chamber, 7 x 12 feet, with an arched roof 6 feet high. The whole front of this oven is movable, and the coke is drawn by means of a drag laid across the back of the oven prior to the charging."

The essential difference between the old Welsh oven and the Thomas exists in the facts that the latter is much longer, affording greater capacity, and that both ends are movable; thus doing away with the necessity of placing the drag in the oven prior to charging. In nearly every respect the ovens themselves are identical.

At Coalburg there are 64 Thomas ovens arranged in one continuous battery. In construction the same principles are carried out and material used as in the beehive ovens, except that the bottoms are of hard, red brick, upon the theory that they resist the wear of the drag better than the fire brick. In detail they are described as follows, viz.: Length, 36 feet; width inside, 7 feet 8 inches at back; width inside, 7 feet 9 inches at front; height over all, 8 feet; height of door, 4 feet; height inside, 5 feet; fall in bottom from back door to front, 1 inch. Both the back and front are movable and have swinging doors which are in two sections and built of fire brick of special design laid in iron frames. There are three openings on top—two tunnel heads and one draft stack near the back end of the oven. In front of and on a level with the floor of the ovens is an "apron" of stone and brick masonry, 8 feet wide and running the entire length of the battery. Four feet below this apron is another piece of masonry 7 feet wide, which also runs the entire length of the battery, on which the track for the "dinkey" containing the machinery for drawing the coke is located. Still further below is the railroad track, on which are placed the cars for the receipt and shipment of the coke. At the rear of the battery is another track on which runs a car used for conveying the "drag" from oven to oven, and on this car is permanently fixed a crab for pulling the drag back after discharging.

In the process of coking, the same general principles as to drafting, &c., are observed as in the beehive ovens. It is proper to state, however, in this connection, that in the original construction of the ovens, a flue was put in for the admission of air, but in practice, it is found that an ample quantity unavoidably finds its way in through the crevices of the doors, in consequence of which it is necessary to keep the flues closed. Twelve tons of coal are charged from two 6-ton larries, through the tunnel heads, and the leveling is done from both ends. When ready to "draw," the doors at both ends of the ovens are swung open and an iron rod passed through the oven over the top of the hot coke and attached to the drag at the rear. The hot coke is thus drawn in a body out

at the front end of the oven and over a screen attached to the dinkey, at which point the fire is quenched with water falling from a tank, situated above the screen (no water whatever being thrown into the oven). From the screen it falls in broken pieces to the railroad car below and is ready for shipment.

The yield is practically the same as from the beehive ovens, under skillful management, and the quality of the product, so far as can be determined by analysis and observation, is fully up to the standard. I regret that I cannot present data showing its relations to the beehive coke in furnace practice, but the conditions of consumption are such that it has not been practicable to make such a test.

It is unnecessary to enumerate the many advantages claimed by the patentee for his ovens, at the time of construction, nor the many discouraging circumstances that have been met with incident to their management, and I shall confine myself to a statement of results as I know them to be. I find:

1. The yield is equal to the beehive oven.
2. The quality of product is fully up to the standard.
3. That it is practicable to quench the coke outside the oven without detriment to its quality, resulting in leaving the oven hot and dry for the reception of the following charge of coal.
4. The saving of one handling, by which a large percentage of coke is saved, which would otherwise be rejected as braes.
5. Economy in production. In demonstration of this last statement, the following table, showing the comparative cost of labor between the beehive and Thomas ovens, is submitted, viz.:

Statement Showing Labor cost of Coke, by Months, for Fiscal Year Ending January 31, 1891,

(Coalburg Department.)

Months.	General average beehive ovens.	Thomas ovens.	Difference between Thomas ovens and beehive.
February, 1890...	\$0.415	\$0.402	\$0.013
March, 1890.....	.440	.343	.097
April, 1890.....	.397	.301	.096
May, 1890.....	.385	.332	.053
June, 1890.....	.424	.274	.150
July, 1890.....	.432	.288	.144
August, 1890....	.435	.239	.196
September, 1890..	.466	.246	.220
October, 1890....	.474	.300	.174
November, 1890..	.405	.303	.102
December, 1890..	.731	.249	.482
January, 1891....	.416	.280	.136

Average for year, \$0.440 \$0.291 \$0.149

Average cost per ton, beehive oven... \$0.44
Average cost per ton, Thomas oven..... .291

Difference in favor of Thomas ovens, \$0.149

By reference to the above figures, it will be seen that the cost during the first months of the year was considerably more than the succeeding months. Had the ratio of the latter months been maintained throughout the year, the average cost of production would have been considerably less. In explanation of this, I will state that at the time I took charge of the ovens in December, 1889, the coke was costing considerably more than the highest figure shown, the product did not exceed 50 per cent., and the quality was so poor and its condition, when placed upon the cars, of such character as to cause its universal condemnation. The president of our company was utterly discouraged, and had about decided to abandon them, and probably would have done so but for my earnest solicitation to be allowed an opportunity to give them a trial. Considerable time was, of course necessary to perfect reform and obtain results, but that results have been obtained the above figures and

the good quality of the present product will testify, and with still further reforms and changes which I have in contemplation, I am confident that the average labor cost for the present year will not exceed 25 cents per ton.

The above figures include all items of cost except material for repairs, which latter I have not at hand, but can state that such cost is less than for the beehive ovens.

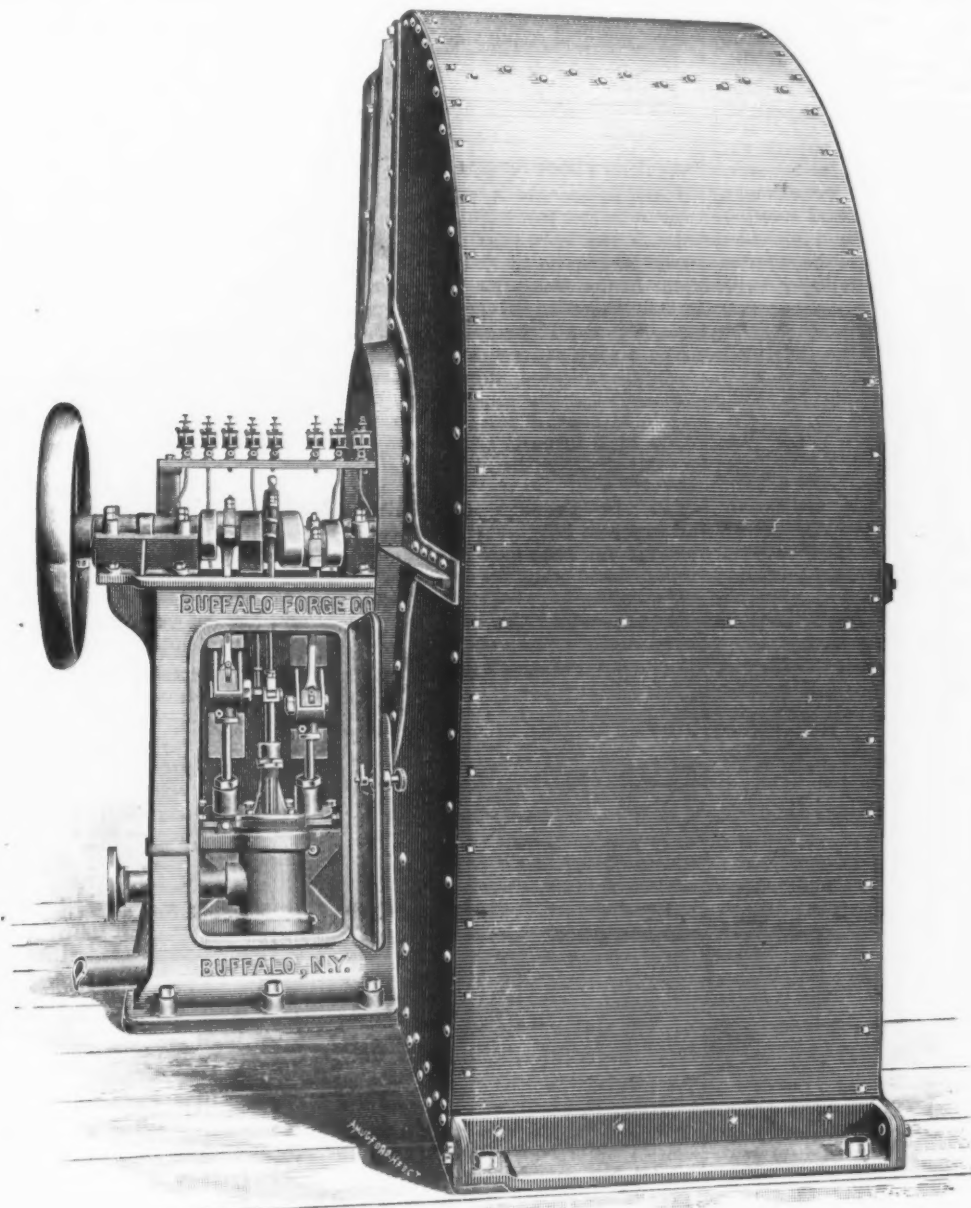
I am confident that a great many improvements can yet be made upon the

The Buffalo Steel-Plate Steam Fan.

To secure a type of engine which would develop a large amount of power at high rotative but moderate piston speed was the aim in producing this design. The work required of steam fans for forced draft duty under steamboat boilers demands the above, and the illustration presented herewith clearly portrays the construction of the double upright inclosed engine, built by the Buffalo Forge Com-

pany, Buffalo, N. Y., and employed with their steel-plate blowers for such service. In passing, it may be mentioned that the proportions of the fans are governed by the pressure of air which each is designed to produce. For high pressures or velocities of air the fan wheel is comparatively very narrow and the diameter much greater than the usual proportion where used for hot-blast heating work or service requiring average velocity. By thus giving the wheel a large peripheral velocity, the desired pressure is secured at a speed on the engine which is not at all injurious to its life. Where this engine is to be used in dusty situations, it is built with the working parts entirely inclosed. The engine frame is rectangular, wider at the base than at the bearings. In the larger sizes the cylinders are bolted to the base, which

forms a part of the housing, and they are so arranged that the piston can be readily removed by withdrawing the bolts of the cylinder head and lower end of the connecting rod, whereby the cross head, cylinder head and piston can be lifted out without removing any other part. The steam chest is bolted to the cylinder, that it may be easily removed when desired. The crosshead slides are so joined to the frame as to enable adjustment for wear. The crossheads have magnolia metal gibs to prevent cutting of the slides, and have



THE BUFFALO STEEL-PLATE STEAM FAN.

oven that will not only lessen the cost of production, but result in large savings in other ways. At Coalburg, I believe that by a simple arrangement of flues, similar in construction to those attached to the Welsh ovens at Browney colliery in the Durham region, England, a sufficient quantity of gas, which is now wasted, could be utilized, without detriment to the coke, to run all machinery of the adjacent coal mines.

In conclusion, I will state that while I am not by any means an enthusiast in regard to the Thomas ovens, I do feel that enough has been accomplished and demonstrated to cause us to step aside—at least for consideration and investigation—from the commonly accepted opinion that there is no oven equal to the beehive.

pany, Buffalo, N. Y., and employed with their steel-plate blowers for such service. In passing, it may be mentioned that the proportions of the fans are governed by the pressure of air which each is designed to produce. For high pressures or velocities of air the fan wheel is comparatively very narrow and the diameter much greater than the usual proportion where used for hot-blast heating work or service requiring average velocity. By thus giving the wheel a large peripheral velocity, the desired pressure is secured at a speed on the engine which is not at all injurious to its life. Where this engine is to be used in dusty situations, it is built with the working parts entirely inclosed. The engine frame is rectangular, wider at the base than at the bearings. In the larger sizes the cylinders are bolted to the base, which

clamp joints for the piston rod, which is bored tapered to receive the hardened wrist pin. The pistons are of the snapping pattern, the rings of which are made of special metal (some having been used for a long time without internal lubrication). The valve is of the piston type, steam being admitted at the center instead of at the ends. The rods have large wearing surfaces, crank end is lined with magnolia metal, and the wrist end has phosphor bronze boxes with wedge adjustment. The crank end adjustment is similar to that of the marine engine; the shaft is of crucible cast steel, the cranks being opposite each other, and the eccentric is cast centrally between. By specially arranged jigs these cranks and eccentrics are so turned that their relative positions are

such as to give the proper position to the valve at various points of the stroke. The eccentric strap is lined with genuine babbitt, the bearings, which in their ratio are large, are bolted to the main housing, and lined with a special brand of babbitt metal, also fitted with an improved oiling ring. While every portion is made as compact as possible, yet the arrangement is such as to give ready access to all parts of the engine without disturbing others. The stuffing boxes are provided with nuts, which screw on to the glands, and while standard packing is employed, if desired, approved metallic packing may be substituted. To prevent corrosion, brass glands are used for the rods; the valve rod is of steel, and fitted with hardened pin and clamp joint. The steam chest head has a phosphor bronze bushing to form a guide for the valve rod. The eccentric rod has means for adjusting the valve without removing the cover. No rocker or its substitute is used, the object being to reduce the engine details to the fewest possible number—a great desideratum in all high-speed engines. A hand wheel on the shaft, that the engine may be thrown off the center, is provided.

These machines have been introduced largely into ocean steamships, and are usually so arranged as to serve two purposes, viz., of inducing perfect combustion of fuel and obtaining the greatest steaming capacity of boilers, and at the same time of ventilating the hold and other portions of the ship. The full effectiveness of the steamboat boilers is always insured, and is entirely independent of the direction or force of the wind.

Wages in German Iron Mines.

Some interesting statements regarding the wages paid German iron ore miners have recently been published by the Prussian Government.

In the iron mines of Prussia the following were the daily and annual average earnings of the workmen employed in the undermentioned years, stated in marks:

	1888.		1889.	
	Daily.	Ann.	Daily.	Ann.
	Mks.	Mks.	Mks.	Mks.
Mansfeld.....	2.66	757	2.89	802
Harz.....	1.99	592	2.03	603
Siegen-Nassau.....	...	...	2.36	658
Rhine (right bank).....	...	...	2.11	597
Rhine (left bank).....	...	...	2.18	626
	1890.		1891.	
	Daily.	Ann.	Daily.	Ann.
	Mks.	Mks.	Mks.	Mks.
Mansfeld.....	3.01	853	3.16	913
Harz.....	2.04	613	2.02	610
Siegen-Nassau.....	2.46	676	2.33	648
Rhine (right bank).....	2.36	689	2.30	640
Rhine (left bank).....	2.22	634	2.25	642

It is clear from these figures that the progress made by the iron-ore miners of Prussia has not been nearly so great as that made by the coal miners. In one or two cases, indeed, the average earnings have declined. This is largely due to the fact that Prussia is not making headway as an iron-ore producing country. The tendency is to draw more and more ore from the cheap and abundant fields of Alsace-Lorraine and Luxemburg, and less and less from the older fields above mentioned. Between the years 1888 and 1891 the total number of hands employed in the same ore-mining districts has fallen off, as shown below:

	1888.	1891.
Mansfeld.....	13,504	14,230
Harz.....	3,541	3,292
Siegen-Nassau.....	23,851	22,618
Rhine (right bank).....	6,047	5,907
Rhine (left bank).....	4,642	4,773

The average day's labor in the iron ore mines of Prussia appears to be larger than in the coal mines of the same State. In the Upper Harz the average day is returned at 10.8 hours, including descent and ascent. On the Rhine the ore miners

work from 9.4 to 10 hours. The mines appear to be worked pretty steadily, if we may judge from the fact that in the Clausthal district the men have averaged 74 shifts in the last quarter of 1891, and that in the Siegen-Nassau district and on the left bank of the Rhine the average was 71 hours. In the latter district the average wage of 2.34 marks per shift was made up of the following component parts:

	Marks per shift.
Miners.....	2.54
Other underground men.....	2.06
Surface workers.....	2.18
Boys under 16 years.....	1.17
Women.....	1.11

The mark is equivalent to about 24½ cents.

The Production of Iron Ore.

[With Supplement.]

John Birkinbine of Philadelphia has recently issued his report on the production for the year 1891, which is a part of the volume on the "Mineral Resources of the United States," edited by Dr. David T. Day, Chief of the Division of Mining Statistics and Technology of the United States Geological Survey. We have reproduced, in colors, a graphic representation showing the output of the more prominent sources of the iron ore supply for the blast furnaces of the United States. In some of these districts, owing to the destruction of the records by fire, they cannot be traced back for 20 years, and in others no statistics have been kept; but it is interesting to note the advance of some sections and the decline in others.

The figures of production will be found in the following table:

Outputs of Prominent Sources of Iron Ore Supply for Twenty Years.

Years.	Marquette range.	Menominee range.	Gogebic range.	Vermillion range.	New Jersey.	Cornwall, Pa.
	Long tons.	Long tons.	Long tons.	Long tons.	Long tons.	Long tons.
1872.....	943,533	...	...	...	600,000	193,317
1873.....	1,105,234	...	...	...	605,000	166,782
1874.....	899,934	...	...	...	525,000	112,429
1875.....	881,166	...	...	...	380,000	96,925
1876.....	963,311	...	...	...	285,000	137,902
1877.....	1,014,754	10,375	...	...	315,000	171,589
1878.....	1,033,082	78,028	...	...	409,674	179,296
1879.....	1,130,019	245,672	...	...	488,028	268,488
1880.....	1,384,010	524,735	...	...	745,000	231,173
1881.....	1,579,834	726,671	...	...	737,052	249,050
1882.....	1,829,394	1,136,018	...	...	932,762	309,681
1883.....	1,305,364	1,047,863	...	...	521,416	363,144
1884.....	1,559,912	895,631	1,022	62,122	393,710	412,320
1885.....	1,430,892	690,435	119,590	227,075	380,000	508,664
1886.....	1,627,383	880,006	756,237	307,948	500,501	688,054
1887.....	1,851,717	1,199,343	1,285,295	394,910	547,889	667,210
1888.....	1,918,672	1,191,097	1,433,689	511,953	447,738	722,917
1889.....	2,631,026	1,876,157	2,147,923	864,508	415,510	769,025
1890.....	2,863,848	2,374,192	2,914,081	891,910	495,808	686,302
1891.....	2,778,482	1,856,124	2,041,754	945,105	525,612	663,746

Years.	Lake Champlain, N. Y.	Missouri.	Ohio.	Alabama.	Importations.
	Long tons.	Long tons.	Long tons.	Long tons.	Long tons.
1872.....	350,000	Unknown.	Unknown.	Unknown.	27,000
1873.....	420,000	Unknown.	Unknown.	Unknown.	62,000
1874.....	250,000	Unknown.	Unknown.	Unknown.	69,000
1875.....	300,000	Unknown.	Unknown.	Unknown.	83,000
1876.....	200,000	Unknown.	Unknown.	Unknown.	26,000
1877.....	365,000	Unknown.	Unknown.	Unknown.	42,000
1878.....	380,000	Unknown.	Unknown.	Unknown.	29,765
1879.....	480,000	Unknown.	Unknown.	...	284,141
1880.....	700,000	Unknown.	Unknown.	171,130	493,408
1881.....	637,000	Unknown.	Unknown.	229,000	782,887
1882.....	725,000	Unknown.	Unknown.	250,000	589,655
1883.....	510,000	Unknown.	Unknown.	385,000	490,875
1884.....	530,000	233,225	Unknown.	420,000	487,820
1885.....	420,000	169,162	Unknown.	505,000	390,786
1886.....	588,829	379,776	344,484	650,000	1,039,433
1887.....	768,852	427,785	377,465	675,000	1,194,301
1888.....	669,553	217,931	253,352	1,000,000	587,470
1889.....	779,900	265,718	254,294	1,570,319	853,573
1890.....	821,064	181,690	169,088	1,807,815	1,246,890
1891.....	554,865	106,740	104,487	1,988,830	912,864

Those of the Marquette range, up to and including 1877, were taken from the Michigan Mineral Statistics, from 1878 to and including 1888; the data for the Marquette, Menominee and Gogebic ranges were obtained from a table compiled by

W. J. Stevens. The figures for the remaining years and for the other districts were obtained from the reports of the United States Geological Survey. No reliable statistics for the output of the Alabama mines can be obtained, except for the last three years, but as before stated the estimates were carefully made.

The first range which was opened in the Lake Superior district was the Marquette, and it is to-day the largest contributor to the country's iron ore supply. It reached a total of 1,000,000 tons in 1873, suffered a decline for three years, and since then has shown an almost constant increase, reaching its maximum in 1890, when 2,863,848 long tons were mined.

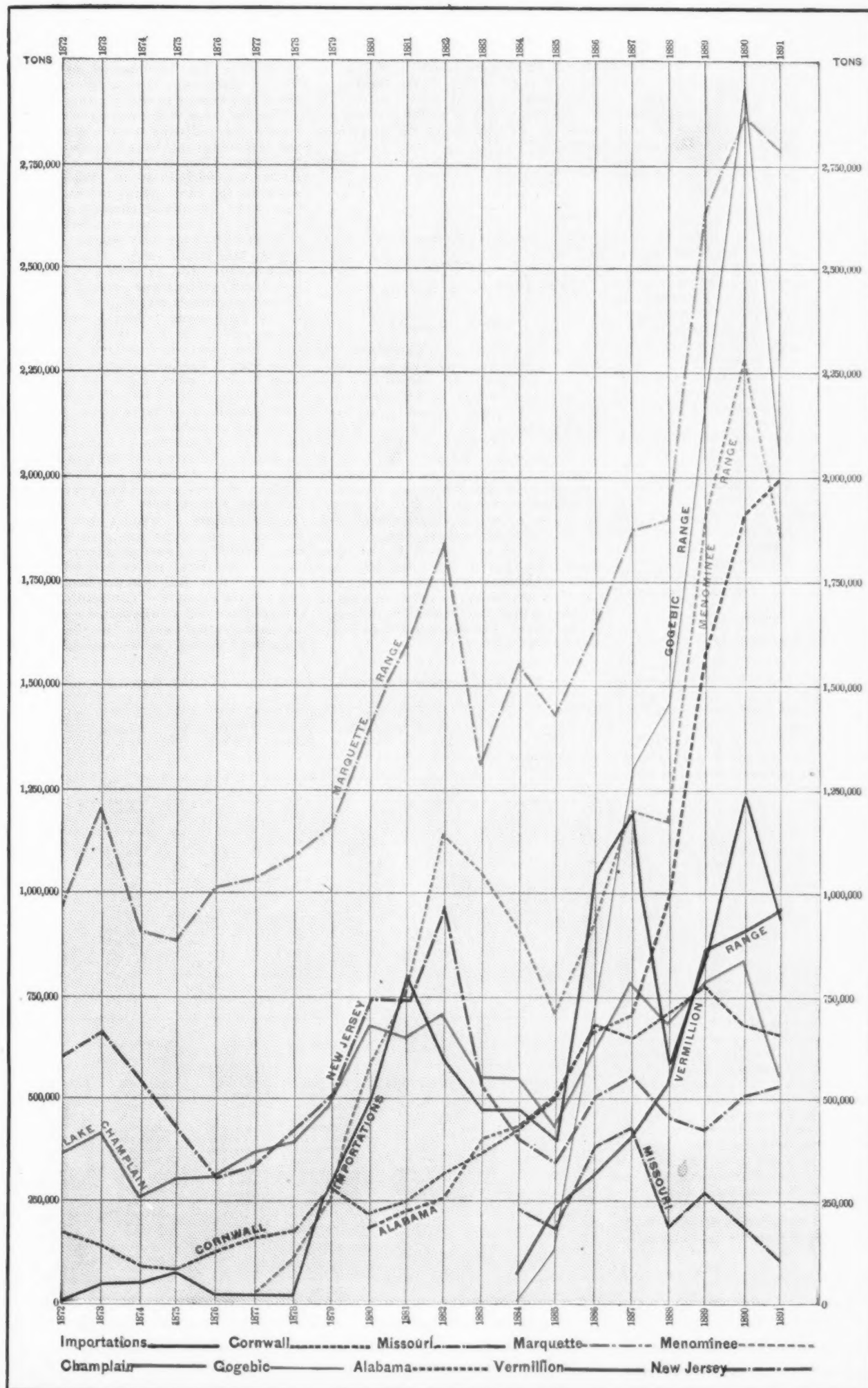
The Menominee range, from its first shipment in 1877, increased its output until 1,000,000 tons was reached in 1882. In 1883 its product was slightly less, and in the three years following, owing to a depression in the iron trade, its output was under 1,000,000 tons; but since 1887 it has been increasing, reaching the maximum in 1890, when 2,274,192 long tons were produced, but it fell off in 1891.

The Gogebic and Vermillion ranges were developed in the same year, viz., 1884, but the former soon outstripped its rival, reaching an output of over 1,000,000 tons in 1887, and in 1890, 2,914,081 long tons were mined. Its 1891 product was 870,000 tons less than that of 1890. The Vermillion range has shown a constant growth each year and reached its maximum in 1891, when 945,105 tons were produced.

The New Jersey mines have advanced and declined according to the demand for ores and the keenness of competition with other districts and with imported ores. They maximum output was in the year 1882, when 932,762 long tons were mined. Since

1886 the production has remained comparatively uniform, its average being in the neighborhood of 500,000 long tons annually.

While the ore of the Cornwall Ore Hills in Pennsylvania is lower in its percentage



FLUCTUATIONS IN THE PRODUCTION OF IRON ORE IN THE UNITED STATES.

From a Chart Prepared by John Birkinbine for the "Mineral Resources,"
issued by the U. S. Geological Survey.

of iron than the Lake Superior or Lake Champlain ores, it is of Bessemer quality and is cheaply mined. The enormous increase in the Bessemer steel industry and the nearness of the mines to points of consumption have encouraged a large demand for this ore, the amount mined increasing from 98,925 tons in 1875 to 769,020 tons in 1889. In 1890 and 1891 smaller amounts were won.

In the earlier history of the Lake Champlain region of New York most of its iron ores were used to supply the needs of the blast furnaces, forges and bloomeries which abounded in that district; but, although the number of these plants has decreased, the average output of the district has increased, owing to the demand for high-grade ores from blast-furnace plants in New York and other States, and it is therefore but natural that its largest output was in the same year as the maximum pig-iron product, viz., 1890, when 821,994 tons of iron ore were mined.

The major portion of Missouri's output of iron ore came from Iron Mountain and Pilot Knob, and the exhaustion of the latter deposit, in connection with the abandonment of some of the smaller mines, has led to a gradual decline. Of the years for which figures could be obtained, 1887 gives the maximum output, viz., 427,785 long tons, while the smallest product was in 1891 (106,749 tons).

The demand for iron ores carrying a high percentage of iron and below the Bessemer limit in phosphorus has attracted considerable foreign ore. This is, however, consumed on the Atlantic and Pacific coasts; very little, if any, being used west of Pennsylvania, with the exception of the small amount imported on the Pacific coast, which is used at small furnaces near the port of entry. Until the year 1879 the amount was below 100,000 tons, but in that year over a quarter of a million tons were imported, and of late years it has exerted a considerable influence in the Eastern markets. The largest imports were in 1890, when 1,246,830 tons were brought from various foreign countries. This year, however, the shipments were about 25 per cent. less.

All of Ohio's iron ores are found in the Coal Measures, and are either carbonate or altered carbonate. The output has fallen from 377,465 long tons in 1887 to 104,487 tons in 1891, owing to the facilities for supplying local blast furnaces with the richer Lake Superior ores.

Nearly all of the Alabama ores are used in local blast furnaces, and as the number and output of these furnaces increased the iron ore output also showed a corresponding advance, rising from 171,139 long tons in 1880 to 1,000,000 tons in 1888, and in the year 1891 to a still further advance to 1,986,830 long tons.

The total amount of iron ore produced in the United States in the calendar year 1891 was 14,591,178 long tons, and that of 1890 was 16,036,043 long tons, or including an allowance of $1\frac{1}{2}$ per cent. for the smaller mines not reporting 14,810,046 tons in 1891, against 16,276,584 tons in 1890, a falling off of 1,466,538 long tons, or 9.01 per cent.

The years 1889 and 1890 are both notable for large productions of pig iron, the latter year showing a greater output of metal for the United States than ever recorded previously; but in the year 1891 there was a marked decline. The result of this condition of affairs was to greatly stimulate iron-ore mining, particularly in 1890, and to depress it in 1891 more rapidly than the decrease in the pig-iron output would suggest.

The iron ores of this country have been subdivided, as in the 1890 report, into the following general classes:

1. *Red hematite*, being all anhydrous hematites, although known by various names, such as red hematite, specular, mica-

ceous, fossil, slate-iron ore, martite, blue hematite, etc.

2. *Brown hematite*, including the varieties of hydrated sesquioxide of iron, and recognized as limonite, goëthite, turgite, bog ores, pipe ores, &c.

3. *Magnetite*: those ores in which the iron occurs as magnetic oxide, and including some martite, which is mined with the magnetite.

4. *Carbonate*: those ores which contain a considerable amount of carbonic acid, such as spathic ore, blackband, siderite, clay-iron stone, &c.

The following table exhibits the amounts of the different characters of iron ore produced, and also the total outputs during the year 1891, for various States and Territories:

The Iron Ore Product of the United States in 1891, Distributed by Classes and States.

States.	Red hematite.	Brown hematite.	Magnetite.	Carbonate.	Total.
	Long tons.	Long tons.	Long tons.	Long tons.	Long tons.
Michigan.....	5,445,371	457,507	224,123		6,127,001
Alabama.....	1,524,783	462,047			1,986,830
Pennsylvania.....	162,683	363,894	727,299	19,062	1,272,938
New York.....	153,723	53,152	782,729	27,612	1,017,216
Minnesota.....	945,105				945,105
Virginia.....	3,274	653,342	2,300		658,916
Wisconsin.....	527,705	61,776			589,481
Tennessee.....	396,883	147,040			543,923
New Jersey.....	3,850	3,840	517,922		525,612
Georgia.....	45,027	205,728			250,755
Colorado.....	6,940	99,253	4,749		110,942
Missouri.....	99,518	7,431			106,949
Ohio.....				104,487	104,487
Kentucky.....		45,111		19,978	65,089
Texas.....		51,000			51,000
Massachusetts.....		47,502			47,502
New Mexico.....		1,000	38,776		39,776
Maryland.....		19,400		17,979	37,379
Connecticut.....		30,923			30,923
Oregon.....		29,018			29,018
North Carolina.....			19,210		19,210
Montana.....	8,536	4,000			12,536
Utah.....	4,000	8,000			12,000
West Virginia.....		6,200			6,200
Idaho.....		400			400
Totals.....	9,327,398	2,757,564	2,317,108	189,108	14,591,178

From this table it will be seen that the quantity of red hematite produced, viz., 9,327,398 long tons, was 63.92 per cent. of the total ore mined during 1891, indicating a decline from the output of 1890 (10,527,650 long tons) of 1,200,252 long tons, or of 11.40 per cent. The brown hematites, of which 2,757,564 tons were produced, or 18.90 per cent. of the total ore supply, exceeded the 1890 output of 2,559,938 tons by 197,626 tons or 7.72 per cent. The magnetite mined in 1891 was 2,317,108 long tons—that is, 15.88 per cent of the total output of iron ore—as against 2,570,838 tons in 1890, a decline of 253,730 long tons or 9.87 per cent. But 189,108 tons of carbonate ore, or 1.30 per cent of the total ore output, were produced in 1891, a falling off of 188,509 tons, or 49.92 per cent., from the 1890 output of 377,617 tons.

In the table the States are arranged in their order of precedence as producers of iron ore.

To compare the percentages of the total output of the different kinds of iron ore produced in the United States in the years 1880, 1889, 1890 and 1891 the following statement is presented (the figures for 1880 and 1889 are taken from the census returns):

Percentages of Different Classes of Iron Ores Produced in the United States in 1880, 1889, 1890 and 1891.

Character of product.	1880.	1889.	1890.	1891.
	Per cent.	Per cent.	Per cent.	Per cent.
Red hematite.....	31.51	62.38	65.85	63.92
Brown hematite.....	26.95	17.38	15.96	18.90
Magnetite.....	29.97	17.26	16.03	15.88
Carbonate.....	11.57	2.98	2.36	1.30

The census year 1880 is the first authentic record which gives the outputs of the different kinds of ore. In that year about one-ninth of the total amount produced was carbonate ore. The red hematite, magnetite and brown hematite mines produced nearly equal quantities, there being a divergence of but $4\frac{1}{2}$ per cent. between those furthest removed, viz., the red hematite and brown hematite, the magnetite coming between the two. In 1889 the grand total for the country was more than double the 1880 output. The proportion of red hematite increased until over 62 per cent. of the ore won was of this character, the brown hematite and magnetite following in the order named, there being only a difference of a fraction of a per cent. between the proportions of these last two.

The carbonate ore brought up the rear with about 3 per cent. of the total.

The increased demand for iron ores again advanced the total for the United States in 1890 over 10 per cent. above what it was in the previous year. Nearly two-thirds of the total for 1890 was red hematite, the production of magnetite and brown hematite again being nearly equal, each amounting to about one-sixth of the output for the United States, but the 1889 order of precedence is reversed, more magnetite than brown hematite being mined in 1890. The carbonate ore continued the smallest factor, with but slightly over 2 per cent. of the country's total.

The year 1891 shows a decline in the output of the United States, the quantity being considerably below 1890, but greater than the total of 1889.

The red hematite still furnishes by far the largest proportion of the iron ore output of the United States, but the percentage of this class has slightly fallen off, as has also that of the magnetite and carbonate, while the proportion of brown hematite has increased, it now ranking next to the red hematite.

The great Industrial Building, now approaching completion on Lexington avenue above Forty-third street, in this city, is constructed entirely of iron, brick and other fire-proof material, the roof being carried on iron girders, and its special feature will be a convention hall capable of seating 14,000 people. The ground dimensions are 200 x 275 feet and the height six stories. The investment is \$1,500,000.

The authorities at Ottawa claim that many emigrants are arriving in the Northwest from the United States.

The Colorado Fuel Company.

The Colorado Fuel Company have just published their report for the fiscal year ending June 30. Its salient features are: The net earnings have amounted to \$352,002.27; from this amount \$32,641.52, being 5 cents per ton on all coal mined from the company's lands, has been carried to the credit of real estate and equipment sinking funds; a dividend of 4 per cent. on the preferred stock was paid February 1, 1892, and a dividend of 4 per cent. on August 1, 1892. The balance of the income account, after deducting bond interest and bond premium (\$57,860), is applicable to the payment of dividends on common stock, viz., \$125,368.04, or about 5 per cent. on the amount of common stock outstanding. From the balance of income account for the year ending June 30, 1891 (\$127,887.68), as shown by the last annual report, a dividend of 3 per cent., amounting to \$125,850, was paid October 1, 1891, and \$2,037.68 was carried to the credit of surplus account.

No additional bonds were sold. Thirty-two thousand dollars of the issued bonds have been purchased and canceled, and \$8000 of the unissued bonds have been canceled in accordance with the provisions of the mortgage in relation to sinking fund, leaving the amount of issued bonds outstanding \$903,000, and unissued \$177,000. The additions to equipment have amounted to \$60,105.81.

The Grand River Coal & Coke Company, the property of the Denver Fuel Company, and the Huerfano Land Association were purchased by sale of \$140,000 bonds, and of the unissued common and preferred stock of the company—viz., \$483,000 common stock and \$322,000 preferred stock.

The company's properties are in good condition, and their maintenance has been charged to operating expenses; only new equipment to increase the capacity of the mines or economize the cost of mining has been charged to capital accounts. The business of the company continues to show a steady increase, and the conditions are favorable for even a larger increase during the coming year. The increased profits have been somewhat disappointing, owing to some extent to increased taxes (due principally to the payment of previous years' taxes which have been in dispute), and an increase in the price paid to miners at Rouse and Pictou mines; selling prices have been fairly well maintained, except in the territory reached by the Atchison, Topeka & Santa Fé Railway Company's coals.

Coal produced, 835,328.70 tons; coke, 54,254.60 tons; total, 889,583 tons. Increase, as compared with 1891: Coal, 86,171.21 tons; coke, 13,609.60; total, 99,780.81 tons.

Statement of Earnings and Expenses.

EARNINGS.			
	1892.	1891.	
Coal sales	\$1,367,641.30	\$1,221,491	
Miscellaneous mine earnings ..	41,151.85	31,529	
Denver retail yard	13,064.22	9,415	
Totals	\$1,421,857.37	\$1,264,435	
EXPENSES.			
For mine and office expenses	\$1,063,775.00	\$956,607	
Insurance, taxes, &c.	13,271.00	6,949	
Totals	\$1,107,046.00	\$963,556	
Net earnings	\$314,810.00	\$300,879	

The census bulletin for Boston shows 7915 manufacturing establishments in 1890, employing 90,198 hands and producing materials valued at \$208,104,683. The following are given as the percentages of increase over 1880: Number of establishments reported, 91.15; capital invested, 111.37; number of hands em-

ployed, 44.35; wages paid, 110.47; cost of material used, 24.58; value of product at works, 53.49.

The Recovery of By-Products in Coke Manufacture.—I.

German coke makers seem to be thoroughly aroused on the question of recovering the by-products in the manufacture of coke for blast-furnace use, a series of papers on the subject having been presented at the recent meeting of the Mining Engineers at Breslau. The papers in question

for combustion of the gases. Besides this there enter into each bath of the bottom flue the pipes *p* and *p*2, which are connected with the gas mains *q* and *q*'. The regenerators are long flues filled with checker work, which pass latterly under all the chambers. At one end a reversing valve connects them either with the air supply pipe, Fig. 3, or with the chimney stack. As soon as the oven is heated and the cooking is in progress, the gases escaping from the coal enter through the openings *b* into stand pipes similar to those attached to the retorts of gas works, and thence they flow through the open valve

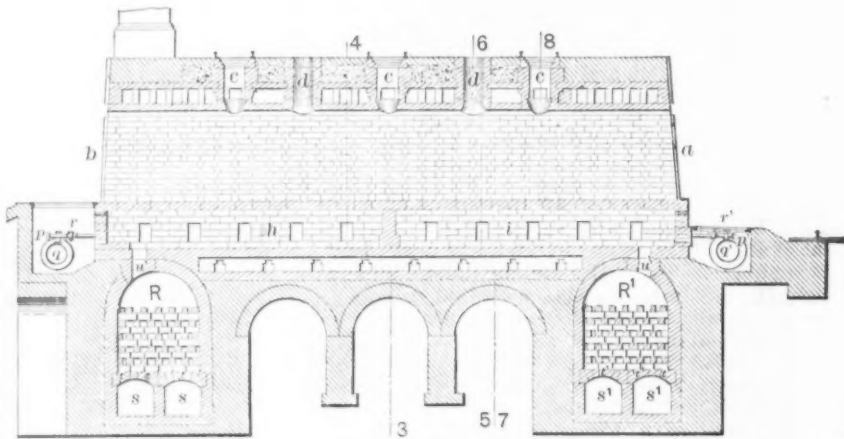
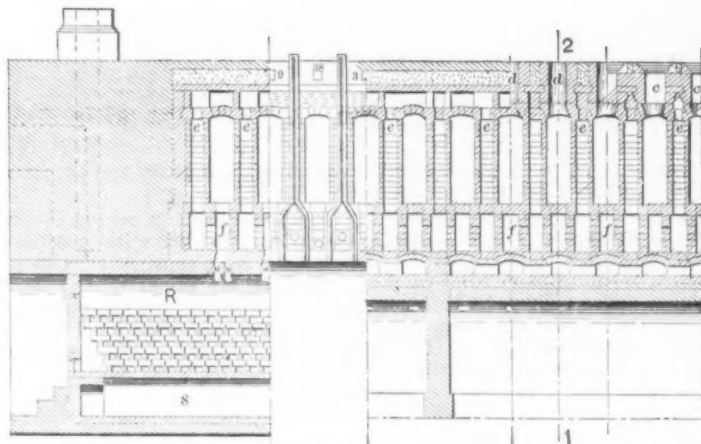


Fig. 1.—Section 1 2, Fig. 2.



Section through Head Wall. Side View (Coke Side). Section 3 4, Fig. 1. Sec. 6 7, Fig. 1. Sec. 7 8, Fig. 1.

Fig. 2.—Section of Oven.

THE HOFFMANN-OTTO COKE OVEN.

dealt with three different systems, and were presented by B. Leistikow, E. Festner and F. Luermann. They were accompanied by drawings, some of which we reproduce from the pages of *Stahl und Eisen*. B. Leistikow describes the Otto Hoffman coke oven, the principal feature of which is that it is regenerated. Fig. 1 shows a longitudinal section, the pusher being placed at the end *a*, while the coke is delivered at the end *b*, where it is quenched. There is no connection whatever between the coke oven proper and the flues and side walls and roof. There are only three openings, *c*, in the oven, through which it is charged, and two openings, *d*, through which the gases may escape. In the side walls a horizontal flue, *e*, Fig. 2, is arranged to connect all the vertical flues. The bottom flue *f* is divided latterly by a wall into two parts, *h* and *i*, each of which is connected with the regenerator R or R'. These serve for heating the air

and through the pipe line *e*, Fig. 3, to the condensing apparatus. In the latter the gas is deprived of its by-products, tar, ammonia and benzole, and is returned to the oven. The method of operation is as follows: Let us assume that the oven is in operation and that as described the gases return through the pipe line *table*, Fig. 3, to it. In this line is a reversing valve, which conducts the gases either into the gas mains *q* or *q*', Fig. 1. When the gases flow through the line *q*, and through it and from it through the pipe *p* into the chamber *h*, Fig. 1, then the reversing valve in the air main is so arranged that the air is delivered into the flues *s s* below the regenerator. After being heated in the latter the air enters the flue *h* through the opening *v*. Combustion takes place in the bottom flue. The hot products thereof flow upward into the vertical flues in the side walls, into the horizontal flues *e*, Fig. 2, go

downward on the other side through the vertical flues, and thence enter the bottom section *i*, Fig. 1, passing into the regen-

It was the original intention, which was carried out in the first plants built, to provide for the regeneration of the gas also;

The condensing arrangements are shown in Figs. 3, 4 and 5, all of the drawings representing the plant built at the Julien-

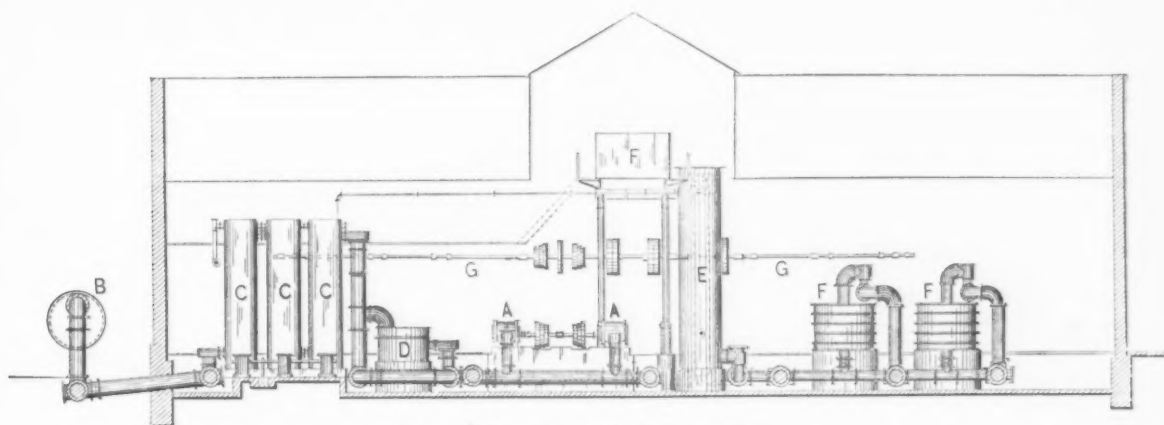


Fig. 5.—Elevation of Condensing Plant.

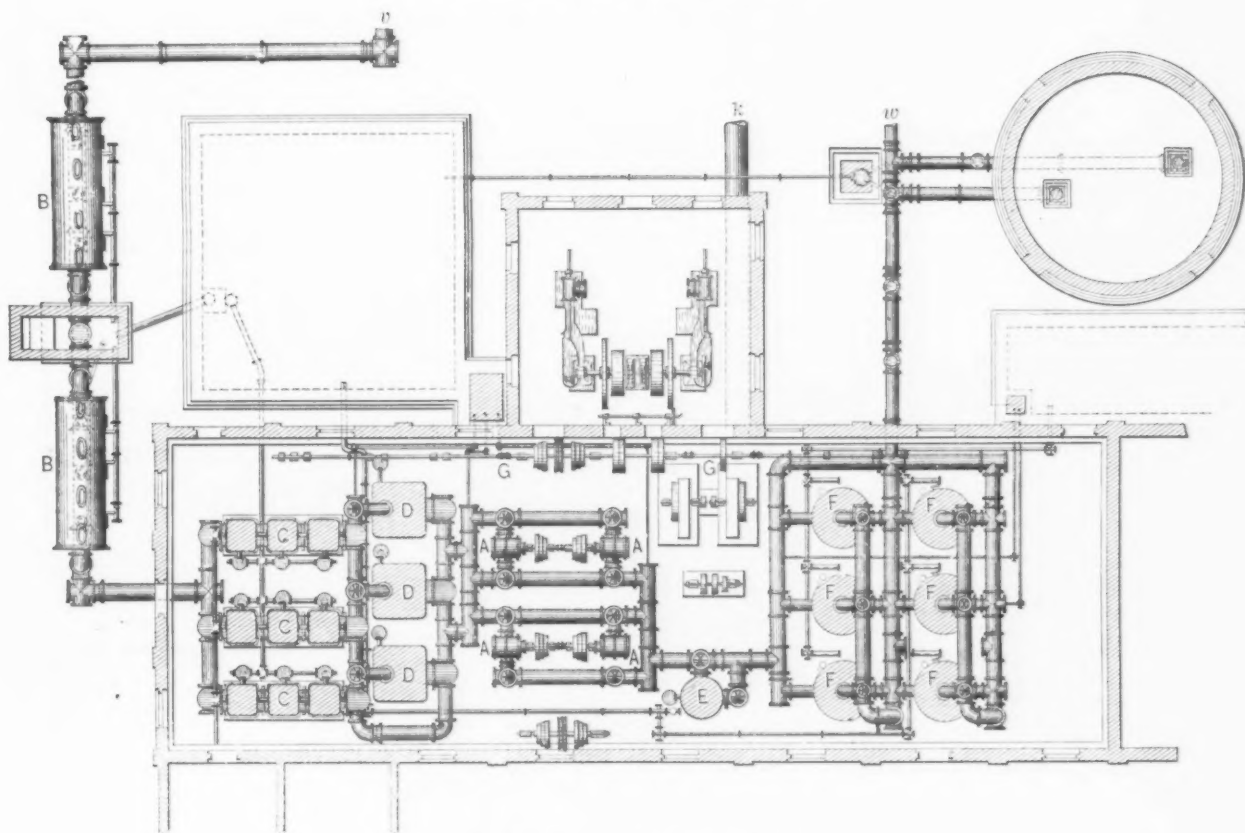


Fig. 3.—Plan of Condensing Plant.

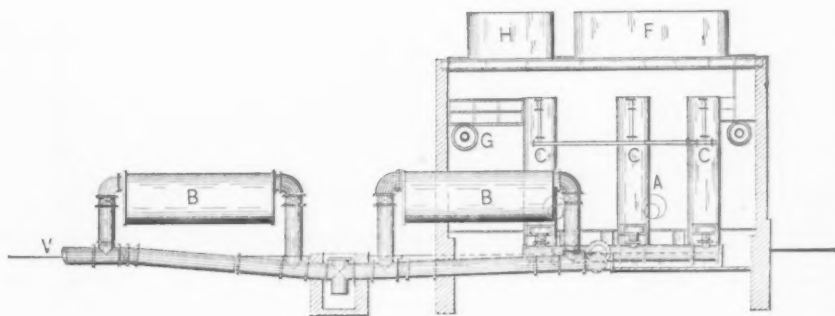


Fig. 4.—Side Elevation of Condensing Plant.

CONDENSING PLANT, JULIENHUETTE COKE WORKS.

erator *R*, which they heat, and thence through *s* to the stack. After a given time the reversing valves are changed, and the flow of gas and air takes the opposite direction.

but this plan was given up. The air is heated to about 1000° Celsius, and it is due to this that only a part of the gas is necessary for heating the ovens without impairing their efficiency.

huette, in Upper Silesia. The gas which goes from the oven through the line *b* is drawn through the apparatus by means of the exhaustor *A*, passing first through the dust catcher *B*, in which a large part of the tar and fine coal is deposited. They enter the condensers *c*, which are upright riveted boxes filled with a large number of wrought-iron pipe, through which water is allowed to flow. The products of condensation are tar and ammonia. Subsequently the gas enters the first scrubbers *D*, which are square, and in which the gas is distributed to a number of pipes dipping into water. It is in this apparatus that the gas is washed for the first time, a weak solution of ammonia being used, which is thereby made stronger, while at the same time tar is also separated. The apparatus is so constructed that water constantly flows into it on the top and off at the bottom. The exhaustors thus far have acted in that capacity. They now become blowers, forcing the gas further, the first effect of the compression being to increase the temperature of the gas. It is driven into the cooler *E*, and then enters the washers *F*.

The gas thus deprived of its tar and ammonia may then be conducted back to the oven, unless it is desired to extract from it further products, like benzole, which can only be obtained in a special way. The method for recovering the benzole is a secret, but is now in use at a number of works. Before flowing back to the oven the clean gas passes through a holder which is intended to act as a regulator of the pressure.

Measurements of the temperature made with a graphite barometer controlled by metal alloys gave 1200° to 1400° Celsius in the bottom flue, 1100° to 1200° Celsius in the side walls, 1000° in the regenerator at the moment of passing in the air, and 720° at the end of that operation, while the chimney temperature is 420° Celsius. The tar is forced into a tank, H, Fig. 4, from which it is delivered into tank cars. The ammonia water goes to another tank, from which it flows to the ammonia factory. The latter consists of two apparatus, O, of the Gruneberg-Blum system, each of which is capable of working 30,000 m. of ammonia water. In order

c. m. per day, which is capable of heating boilers with a surface of 375 sq. m. For the use of the condensing apparatus 140 to 150 sq. m. steam heating surface are necessary, so that a surplus of 230 sq. m. is available for other purposes; 34,000

be of some interest. On 48-hour coke running 30 working days a month a plant will coke 5625 tons of dry coal per month. Experience has shown that 100 parts of dry coal will yield about 1.15 parts of sulphate of ammonia, making a total of

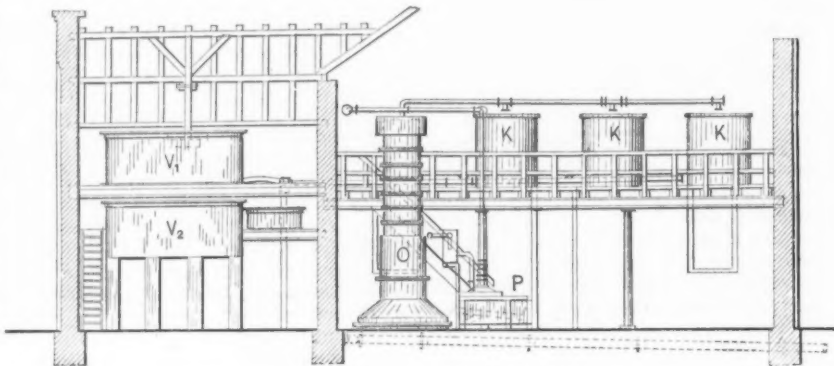


Fig. 10.—Section 1 2, Fig. 7.

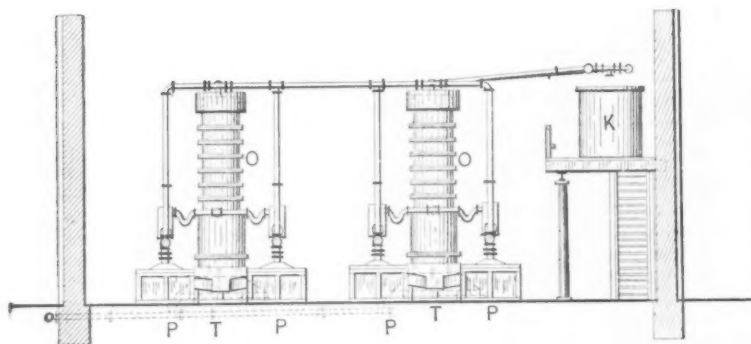


Fig. 9.—Section 3 4, Fig. 7.

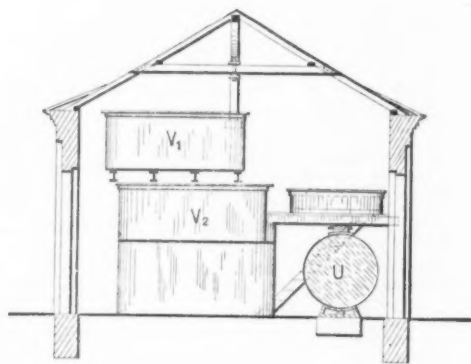


Fig. 8.—Section 5 6, Fig. 7.

to secure also the ammonia which may be passing in combination, milk of lime is used, which is forced into the apparatus from the lime boxes Q. The steam saturated with the ammonia is either conducted into sulphuric acid, stored in lead lime boxes, P, or it is taken to the cooler, K, where it is condensed and furnishes a concentrated ammonia.

When the ammonia fume is run into sulphuric acid to manufacture sulphate of ammonia the salt is placed on a dripping platform, T, Fig. 7. If, however, concentrated ammonia is made it flows from the cooler K into the storage tank U, Fig. 8, from which it is pumped into tank cars. The sulphuric acid is stored in tanks, V₁, V₂.

There were, in operation in 1892, 1205 Otto-Hoffmann ovens, the cost of which is about 5000 marks per oven and 7000 marks per oven for the rest of the plant—a total of 12,000 marks per oven, so that a group of 60 of them calls for a capital investment of 720,000 marks. This may seem extraordinary high, but it is not taken into consideration in view of the large profits. It includes duplication of the greater part of the plant. The quality of the coke produced by the Otto-Hoffmann oven is said to be good, and the yield is larger than that obtained in ordinary ovens from the same coal. With dry coal the yield was formerly 67 per cent., but is now 75, which is supposed to be due to the fact that the ovens, coupled with the recovery of the by-products, must be kept carefully air-tight. It may be assumed that an Otto-Hoffmann oven produces daily about 1000 c. m. of gas, of which 600 c. m. is consumed, leaving the balance for other purposes. A plant of 60 ovens in Westphalia yielded a surplus of gas of 24,000

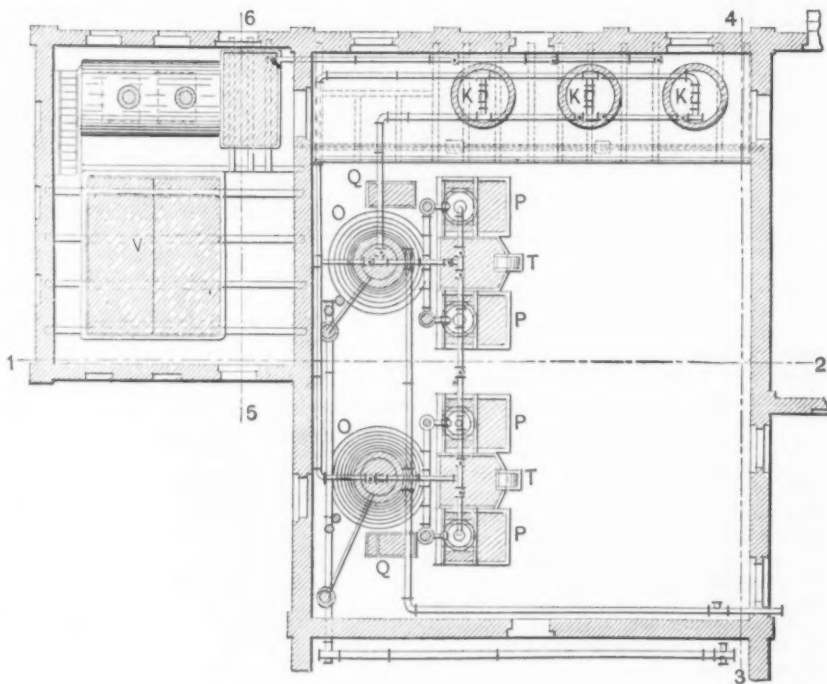


Fig. 7.—Plan.

AMMONIA PLANT, JULIENHUEITE COKE WORKS.

c. m. of gas is equivalent to about 21 tons of coal. At some of the plants in Germany the surplus gas is used for lighting on an extensive scale.

A few figures relating to profits of a plant of 60 coke ovens in Westphalia may

be of some interest. On 48-hour coke running 30 working days a month a plant will coke 5625 tons of dry coal per month. Experience has shown that 100 parts of dry coal will yield about 1.15 parts of sulphate of ammonia, making a total of

64.687 tons per month, and 2.75 parts of tar, a total of 154.687 tons per month. The ammonia is valued at 13,584 marks and the tar at 5424 marks, a total of 19,008 marks. The total outlays, consisting of labor and general costs, are 5700 marks,

leaving a monthly profit of 13,308 marks, or a yearly profit of 159,696 marks. This would show a profit from the recovery of by-products alone of 2661 marks per annum on a capital of 12,000 marks, no allowance being made for interest or depreciation.

A New Process for the Purification of Iron and Steel from Sulphur.*

BY E. H. SANITER, F.C.S.

In September, 1890, I commenced a series of experiments with a view of removing the sulphur from iron. I was impelled to this research by the recognition of the fact that sulphur was the worst enemy and the only one over which the iron and steel manufacturer had not as yet obtained complete control. With this fact in view I made some experiments to ascertain the effect of prolonged contact of lime with sulphury iron at a high temperature. The results obtained were of an irregular and imperfect description. Reasoning from these results, I came to the conclusion that a more readily decomposable body than lime was necessary for the rapid removal of sulphur from iron. Recognizing the fact that chloride of aluminum and other chlorides are readily reducible to the metallic state, I determined to try if calcium chloride acting in this direction might not act upon sulphide of iron more readily. Whether calcium is produced or not, I soon discovered that calcium chloride and lime—i. e., the oxychloride—is a very powerful desulphurizing reagent. The following table indicates clearly the comparative results obtained, the sulphury iron being kept molten in plumbago crucibles in contact with the substances named:

Number of experiment.	Time during which the molten iron was in contact with the mixture.	Sulphur in iron.		Mixture used
		Before treatment	After treatment	
	Hours.	Per cent.	Per cent.	
4	2½	0.38	0.03	Lime.
6	1½	0.30	0.12	Lime.
15	¾	0.42	trace	Lime, 90 per cent.; calcium chloride, 10 per cent.
16	¾	0.42	trace	Lime, 90 per cent.; calcium chloride, 10 per cent.

These results show (1) that lime alone removes a considerable quantity of sulphur from iron if the contact is sufficiently prolonged; (2) that a mixture of calcium chloride and lime in the short space of half an hour completely eliminated the sulphur; further, the lime and the chloride of calcium mixture only softened, but did not fuse. It is upon these last experiments that my process has been elaborated. It consists essentially in bringing chloride of calcium and lime into contact with molten iron or steel under certain well-defined conditions. Before proceeding to describe these conditions it will be desirable to give some information on the important subject of "chloride of calcium." The salt is produced as a by-product, to the extent of many thousands of tons, in the manufacture of ammonia, soda (by the ammonia process), and Weldon's bleaching-powder process. I am informed on the very best authority that at the present time not more than 10 per cent. of this large quantity is utilized, the remainder running to waste for want of a market. The driest calcium chloride obtainable at present contains 70 per cent.

*Read at the Liverpool meeting of the Iron and Steel Institute.

calcium chloride and 30 per cent. of water, and costs about £2 a ton. Before using it is generally desirable to dry it, and this may easily and cheaply be accomplished in a reverberatory furnace at a low heat, the whole of the water of calcium chloride being driven off at a temperature of 220° F. Calcium chloride may also be cheaply produced by mixing "waste pickle" or similar liquors with lime, and utilizing the mixture of calcium chloride, oxide of iron and lime in the basic open-hearth furnace. Fluor spar in conjunction with lime has considerable desulphurizing properties, but it has also some considerable disadvantages—viz., its comparative infusibility and the severe cutting action which it has on the lining when used in furnaces lined with "basic material."

I now come to the description of the process as applied to the removal of sulphur from raw or cast iron. A mixture of calcium chloride and lime is prepared, which will fuse readily at the temperature of the iron to be operated upon. The desired combination is made by grinding calcium chloride and lime together in a mill to thoroughly mix them, and also to bring them to a moderately fine powder. About equal parts of each are required to give the desired fusibility. This mixture is then placed on the bottom of a ladle or receiver, and consolidated by heat or kept in position by other suitable means. The heat may be applied in the first instance by means of a blowpipe arrangement, using blast-furnace gas, but when in continuous use the heat of the ladle itself is quite sufficient. The receiver is then filled with iron, which may be drawn direct from the blast furnace, the heat of which melts the mixture, which, rising up through the metal, removes the sulphur very completely. I do not find it necessary to have a reducing atmosphere, and, indeed, oxidation may be going on concurrently with the removal of the sulphur, as will be seen later on. Notwithstanding this, however, the sulphur is removed as sulphide. Should it be desirable to remove silicon as well as sulphur, the lime of the mixture is replaced by hydrate or carbonate of lime, or even oxide of iron in addition, should these first be insufficient. About 25 pounds of chloride of calcium and an equal weight of lime per ton of iron have been found sufficient to effect purification. In the many trials made, about 3 tons of iron direct from a blast furnace were treated in a ladle at each operation. Although the first or coldest iron from the furnace and hydrate of lime in the mixture were used, no "skull" was made, which is a fact of the very greatest importance, and there can be no doubt that if such a small quantity of metal is not materially chilled, we may safely assume that larger masses would never "skull." The uniformity of the results obtained was very marked, as will be seen by the accompanying analyses:

No.	Class of iron.	Sulphur		Silicon.		Mixture used.
		Before.	After.	Before.	After.	
1	No. 5 hematite	.220	.060	1.6	1.2	Chloride of calcium and hydrate of lime.
2	Hard fire 1.5% phosphorus	.300	.060	1.7	1.4	
3	Gray iron	.070	.008	2.2	1.6	
4	Basic iron	.197	.072	Not estim'd		
5	Basic iron	.191	.062	Not estim'd		
6	Basic iron	.109	.061	Not estim'd		
7	Basic iron	.102	.062	.56	.32	
8	Basic iron	.065	.026	.84	.46	
9	Basic iron	.063	.016	.32	.09	
10	Basic iron	.069	.024	.42	.18	
11	Basic iron	.083	.020	.37	.09	
12	Basic iron	.133	.030	.70	.32	
13	Basic iron	.091	.026	Not estim'd		Chloride of calcium and limestone
14	Basic iron	.060	.008	Not estim'd		

Nos. 7 to 13 are consecutive charges, and show the regularity of the results. It should be stated that the results obtained above were from the application of the process when it was well known from the appearance of the cinder that the resulting pig would be abnormally high in sulphur. The above table shows an average elimination of:

	Per cent.
(1) Sulphur.....	73.6
(2) Silicon.....	35.77

—the removal of silicon being due to hydrate of lime only. The following is an average slag produced by the above treatment:—

	Per cent.
Calcium chloride.....	39.1
Calcium sulphide.....	5.8
Lime.....	38.6
Silica.....	12.9

A considerable part of the chloride of calcium in this slag may be dissolved out with water and recovered for future use. Only a limited quantity of iron (about 50 tons) has been treated in this way, owing to proper plant not being as yet available, the small 4-ton ladle being only a makeshift. The ladle was lined with ordinary fire bricks, which were practically unattacked by the slag at the comparatively low temperature at which the process was conducted. Appliances are in course of construction which will deal with the whole output of the furnace as the metal is run. The plant required is of a simple and inexpensive character, consisting of ladle or receivers on wheels. The cost of materials at present prices is about 6 pence per ton of iron treated, and this will be less when a more efficient receiver is used. It is also very probable that should a demand arise for chloride of calcium the price would go down. Against this extra cost may be set the cheaper production and enhanced price of the pig iron produced.

This process can be adapted to a considerable number of uses, such as (1) the purification of hematite, basic and common (1.5 per cent. P) irons as they run from the blast furnace or cupola, thus producing these qualities of iron low in sulphur and silicon, after which they might be used for direct steelmaking or cast into pigs; (2) the purification of steel in the ladle, after it leaves the furnace or converter. It is a fact pretty well known and established that no sulphur is eliminated in the "basic open-hearth" process as ordinarily worked, and that not only is this the case, but when ore containing much sulphur is used for feeding the bath of steel takes up sulphur, so that under these circumstances it may contain twice as much sulphur as that in the pig and scrap originally used. This is shown by Wedding (*Journal of the Iron and Steel Institute*, page 547, part II., 90), and is confirmed by my own experience. In my process, however, as applied to the basic open hearth, sulphury iron and mineral may be used, and not only is the sulphur not increased in the steel, but a very considerable elimination takes place. In order to attain this result it is necessary at an early period after the charge is melted to obtain an exceedingly basic slag and to add a suitable quantity of calcium chloride to it. By a very basic slag I do not mean what has hitherto been considered as such, but a step in advance of that, with about 50 to 60 per cent. of lime. If these conditions be obtained and maintained it will be found that sulphur is eliminated along with the carbon and phosphorus, and in as satisfactory a manner. The best method of obtaining this condition of slag is to charge along with the metal and scrap a much larger proportion of limestone than usual, about 2 cwt. to the ton. When the charge is melted the slag will be of the required composition, and the chloride of calcium may then be added in several lots at intervals. The quantity of 70 per cent. chloride used is slightly under ½

cwt. on the ton of ingots made. The following table shows the quality of iron which has been used and the steel made from it:

Pig iron used.					Average per cent. of sulphur in metal charged.	Steel made.				
No.	Si.	S.	P.	Mn.		C.	Si.	S.	P.	Mn.
1	0.04	0.76	1.3	0.18	0.58	0.215	0.081	0.027	0.68	
2	0.10	0.45	2.1	0.50	0.35	0.20	0.072	0.052	0.75	
3	0.10	0.45	2.1	0.50	0.35	0.19	0.048	0.054	0.59	
4	0.04	0.25	2.6	1.00	0.20	0.08	0.048	0.025	0.43	
5	0.20	0.23	2.6	1.00	0.19	0.17	0.048	0.045	0.57	
6	0.20	0.22	2.6	1.00	0.18	0.145	0.063	0.042	0.73	
7	0.20	0.22	2.6	1.00	0.18	0.30	0.053	0.045	0.61	
8	0.40	0.22	2.5	1.30	0.18	0.18	0.018	0.034	0.46	
9	0.20	0.17	2.6	1.20	0.14	0.15	0.038	0.040	0.58	
10	0.18	0.16	3.1	1.50	0.13	0.13	0.039	0.040	0.20	
11	0.44	0.15	3.5	1.50	0.13	0.75	0.042	0.040	0.60	
12	0.20	0.15	2.6	1.00	0.13	0.15	0.038	0.040	0.58	
13	0.65	0.13	3.3	1.50	0.11	0.155	0.025	0.035	0.68	
14	0.56	0.05	0.05	3.00	0.05	0.115	0.016	0.010	0.12	

The pig used in the above charges was 7.50 per cent. These analyses have been selected to show the varying percentages of sulphur in the cast iron used and the different grades of steel made. No. 10 is conductivity steel. No. 14, made from white hematite, is Swedish bar quality. The Wigan Coal and Iron Company have now manufactured over 2000 tons of steel, of which the above are examples, from sulphury iron, the process being continually and successfully worked by them. The steel has been sold for all purposes for which basic open-hearth steel is used—namely, wire, hoops, rivet-steel, tin bars, &c.—and has been found to be fully equal in quality to that made from pure cast irons. It is evident from what has been said that no great care is necessary in the selection of materials, the only objectionable elements being silica and silicon. The commonest descriptions of iron scrap and ore may be used subject to the above reservation. The yield of ingots obtained is as good as that in the use of low sulphur iron. The use of common iron high in sulphur and low in silicon and carbon has the advantage that a less quantity of steel scrap is required, and that the consumption of ore for feeding is reduced very considerably. The cost of the chloride of calcium is about 1 shilling per ton on the weight of ingots, but owing to the saving effected in the cost of materials and in the quantities of scrap and ore used, there is in reality a saving of about 4 shilling per ton of ingots. Neither the hearth nor brick work of the furnaces nor the regenerators are in any way effected by the use of calcium chloride, as has been proved by practical experience over a period of six months.

The Transcontinental Association and the Panama Railroad Company are again at odds. The former gives notice that it can no longer pay a guarantee of \$75,000 a month and the latter announces its intention of establishing an independent line of coastwise steamships. Clipper lines around the Horn seem to have smashed the alliance, and in the general scramble for business low rates of freight may be expected.

The Liverpool dock board are charged with not realizing that the supremacy of the port is endangered both from the insufficiency of dock accommodation and depth of water. The fact is that the growth in the size of ocean-going steamers has been so great in late years that the usefulness of the older docks has been restricted; neither the depth of water at their entrances nor their internal accommodations being adequate to meet the change.

METAL-CUTTING TOOLS.—VIII.

Taps and Dies.

Taps and dies for cutting screw threads are of two classes—machine and hand. While they are similar in most other points, in respect to form of thread they differ considerably—that is, according to the accepted practice—though the necessity for the difference is not entirely apparent. Whether for machine or hand use, the construction of the tools should be such as to admit of their being capable of continuous cutting, without requiring an undue amount of power, and giving a resultant thread clean, bright and sharp, and true to size. As in all the tools previously described, the angle of cutting edge and clearance are the principal factors by which the cutting properties of taps and dies are governed; and if these be correct, the operation of thread-cutting is by no means laborious or difficult. The time is not so far behind us but that it may be within the recollection of a middle-aged machinist when these tools were of such crude and imperfect character as to appear veritable monstrosities as compared with those of modern make.

A tap was usually a steel screw, whose thread, while approximately a V form, was of almost any angle except the correct one; while the size varied from the standard to a corresponding degree. The method most commonly used for making the teeth was to file the tap square—going as far below the bottom of thread as would leave a small portion entire. Some mechanics, more than ordinarily particular, would file a shallow groove either with the corner of a square file or a round one. The tap was then tempered, and was ready for service. Clearance was a thing unknown, and in consequence to use these tools was veritably to earn one's bread by the sweat of his brow. While the reason is not apparent, it is a fact that the necessity for the application of correct principles of cutting to threading tools of this class did not appear to be appreciated by the majority until long after it had become universally recognized as a necessity in the construction of almost all others.

It need not be said that the thread resulting from the use of improperly made taps and dies is deficient in the important element of strength, as it is not cut but squeezed into shape, and as a consequence the metal is so strained and tortured as to render stripping comparatively easy. The strength of a properly cut thread should always be sufficient to enable it to remain intact under a tensile strain which would cause the rupture of a rod or bolt whose diameter is equal to that of the outside of thread, provided the length of thread in the nut or tapped hole be equal to its diameter. Its wearing qualities also are much greater, from the fact that the surfaces are clean and smooth, and afford a maximum amount of bearing.

The standard taps and dies made by any one of the numerous concerns engaged in the manufacture of this class of specialties are correct in all essential features of construction; and by their use the cutting of threads may be accomplished with a minimum of power—only so much being required as is actually necessary to do the cutting—without a useless expenditure to overcome a frictional resistance, possibly double that actually applied to the cutting. From the fact that as an article of manufacture the various operations necessary in their construction may be done by the use of the most improved special machinery, these tools can be produced and sold at a profit at a price far below the actual cost of making them in the tool room, where the possible facilities are

necessarily far inferior. As a rule, therefore, it does not pay for even the best-equipped shops to make standard sizes and threads, although for special work it may be cheaper to make than to buy them. As there are many shops, however, whose location is out of convenient reach of the market, and as this renders them dependent on their own resources, the making of these tools becomes a matter of necessity. Others who might conveniently buy still prefer to make them.

But whether from necessity or choice, if it be the practice to make them in the shop, the means of maintaining the desired accuracy should be provided. These consist of carefully cut male and female threads, true to the standard size and angle, which, in order to insure the necessary durability, should be hardened and tempered only sufficiently to relieve the shrinkage strains. Of course, like any other standard gauge, they should never be used except for the specific purpose of gauging, as otherwise there is danger of their accuracy becoming seriously impaired. Taps—threads of very small sizes—should always be cut in the lathe. The chasing tool should be carefully ground to the required form and angle, and so set as to give the cut its exact shape. When nearly down to size, the feed should be extremely light and the tool keen, using plenty of oil to insure smooth, clean work. The size, after each of these finishing passes, should be tested by the gauge. As previously explained, in chasing threads, the point will invariably be larger where the cut starts in, and it is best to give it a very slight taper for a few threads, to insure against being misled by this peculiarity. In trying to size by gauge a wrench should never be used, as any application of force will destroy the accuracy of fit. By placing the gauge in the vise, all the power necessary can be applied by using both hands on the corner, and except on larger sizes this should require but very little exertion.

It is a very common practice to polish the thread, after cutting to size, by means of a pointed emery stick. This, however, is not only unnecessary, but undesirable. The finish left by the tool, if it be in proper order, is perfectly smooth and bright, and the use of emery only tends to impair or destroy the perfection of the work instead of improving it. For square threads, it is well to make a template gauge of one thread and one space, as it greatly facilitates the cutting and prevents the liability to mistakes which may happen if the female thread gauge be depended on entirely. This is owing to the fact that there are several surfaces of contact, and the binding might be in one, while the reduction was being made in another which was already sufficiently small. It is important that the two sides of the thread be finished separately by some form of side-cutting tool, and as a last operation the bottom be finished with a keen, well-cleared square nosed tool, whose edge is set perfectly parallel with axis of the tap. The grooving for all taps is best done in the milling machine, with very slow feed, as there is much less danger of straining or distorting the thread by the cut than where the work is done by planer or shaper, though, of course, the latter may be used with perfectly satisfactory results if proper care can be exercised in feeding. When the necessary facilities are available it is well to finish the groove, after hardening and before tempering, by grinding with a fine emery wheel on index centers. In doing this, however, particularly with a full V thread, the greatest care must be exercised to prevent heating, and consequently drawing the temper of the points of teeth below the degree of hardness required. As this might readily occur without being perceived, it might result in spoiling the tap the first time it was used

by crushing down the points beyond repair.

In shape the groove should be made deeper than that described for reamers, but in other respects it may be the same. Except in extremely large sizes the number of grooves should invariably be four. The relation of their width to that of the teeth may be equal or considerably greater, but never less, as it will not only leave insufficient space for the free discharge of chips, but renders the surface of the teeth unnecessarily large. For hand taps the back ends of the teeth, *i. e.*, the left-hand side of groove, should never be rounded over, although it is not uncommonly done. The reason is, that it tends to cause jamming of the chips, particularly in wrought iron or steel, when the tap is backed, and may seriously injure the thread in the work. The right hand face of groove forming the cutting edge of the teeth should be always radial with axis of tap. If tangent forward, it gives an obtuse angle to the cutting edge, which impairs its cutting properties; and if backward, it weakens the teeth in withstanding the slight frictional strain of backing, and may cause them to break off at the points.

One of the most important operations, and one which is most often neglected or improperly done, is giving the required clearance to the teeth back of the edge. Notwithstanding the fact that it is to this more than to any other feature of taps and dies that their free cutting is due, it is not uncommon to find it altogether omitted. It is needless to say that no matter how carefully or correctly made the tools may be, in other respects, it is impossible for them to cut freely without this clearance, and the consequence is a hard working tap. In the manufactured tools the operation is performed by means of special facilities which are not available in an ordinary machine shop, and the substitute must be hand filing. As the angle of all the different forms of V threads is 60°, the ordinary triangular saw-file, being of the same angle, is of the proper shape, and, although the cut is not the best for the purpose, it may be—and generally is—used. While no exceptional degree of skill is required, it is necessary to exercise the greatest care in the operation, as a mere slip of the file may destroy the cut of the tooth, and a very few such slips will cause the tap to work badly, no matter how freely the large majority of the teeth may cut.

The clearance should be started comparatively close to the edge—say a distance of about one-fourth of pitch of the thread, and worked backward to the heel of the tooth. A very small amount of filing is necessary, starting at nothing and uniformly increasing until run out. If the clearance is made too great, while the tap will cut very freely, it is liable to cut too large by hand, and in backing is apt to jam and chip the tooth points. While apparently a tedious operation, the work can be done in this way more rapidly than might be supposed, and with proper care the result is by no means uncertain. Machine taps being intended to run continuously through the hole do not need to be backed, and consequently such features as are necessary to provide for this, in case of the hand tap, may be omitted. The taps are made much longer in both the thread and shank, the diameter of the latter being a shade less than that of bottom of thread to enable it to slip freely through the tapped hole. The taper should extend from the point of the tap to within 2 or 3 diameters from the end of the thread, the size of the point being slightly less than that of the hole capable of allowing of full thread. This, of course, is below the bottom of the teeth, and insures its starting freely, even if the hole be slightly under size. For this continuous cutting it is necessary to have an ample supply of

a proper lubricant, or the result may be a broken or stripped tap, as well as spoiled work. Menhaden, or some similar fish oil, may be considered as best for the purpose, and as all improved tapping machines and bolt cutters are provided with pumps and tanks, a constant stream of oil may be kept flowing on the tap or bolt with very small expenditure of the lubricant.

Hand taps are generally made three, and sometimes four, to the set for each size, though the number actually required need not exceed two. The first, or taper tap, has full thread the entire length, and is cut taper from the size at the point, somewhat below that of the tap drill, to standard size at the top. It is intended to start the thread in the hole, to facilitate the entering of the starting tap, but its use may be considered as entirely superfluous, and in fact is usually dispensed with. The other three taps are cut standard as to shape and size of thread, the difference being in the finishing of the points. The starting tap tapers, for about one-half its length, from below the bottom of the thread at the point. For through holes it may be used alone by running it entirely through, after the manner of the machine tap. Where the hole is drilled only to a certain depth in the solid metal, the tap should be run in until the point touches bottom, and it is then followed by the plug tap, which has a much quicker and shorter taper, and will therefore carry the full thread to a correspondingly greater depth in the hole.

Where the character of the work does not prevent, the hole is generally drilled enough deeper than the required length of the full thread to allow for the tapered end of the plug-tap, but in case this is not possible the use of the last or bottoming tap is necessary. This has a full thread to the extreme point, the only taper allowed being about a 45° chamfer, to strengthen the leading teeth, which, of course, are required to do all the cutting. Owing to this fact the tap must be used with extreme care, or the teeth will be unable to bear the strain. Of course it is impossible to apply the continuous motion which is proper in the use of the other three taps; it must be worked back and forth when nearing the bottom, and on no account must it be forced after the resistance indicates that it has reached the full cut, or brings up on bottom. The tap has one advantage peculiar to it, in that when the leading teeth become broken or damaged by the exceptionally hard usage to which they are subjected, the end may be ground square off on the grindstone until the next perfect teeth are reached, and the latter carefully beveled from the points back to give clearance.

Most modern hand taps have the shanks turned down to the size of the bottom of the thread, which is much the best form, as it enables the tools to be run through all through holes instead of backing them out. Where the diameter is thus reduced the square head is rendered so much smaller as to necessitate its being very carefully squared and accurately fitted to the wrench, as otherwise it will soon become so worn and rounded as to cause slipping and probable breakage of the tap. For special work, the temper of hand taps may be made to suit the nature of the material for which they are intended; but for general shop use it should not be harder than dark straw color, nor softer than a full brown.

The hardening, like that of the reamer, requires the greatest care and skill to avoid springing or breakage. It should be done in the manner previously described, as also the tempering. In the latter process, the danger of bad results is even more imminent than in case of the reamer, as the delicate points of the teeth will, almost inevitably, be drawn too low,

unless the heating be very slow, to allow of perfect equalization. Whenever obtainable the material used for making taps should be a quality of steel specially designed for the purpose, as it possesses great strength to resist the severe torsional strain to which it is necessarily subjected, without requiring the temper to be drawn so low as to impair its durability. For all tough materials, such as wrought iron, steel, brass, copper, &c., the size of tap drill for the full V thread should be accurately that of the bottom of the thread. For cast iron, as the sharp edge of the full thread has not sufficient strength to prevent its stripping on the edges, the drill should be made of a size suitable for the Franklin Institute standard thread previously described, which will remove the weak and consequently superfluous edge.

Dies.

Dies are made of two distinct forms for both machine and hand use, the solid and the open. For bolt cutting the open or releasing die is almost universally used. While there are numerous different devices used by the several makers of these machines, they are similar in respect to their general characteristics. The die holder or head is fitted to the machine spindle, and carries usually four, sometimes but three, radial sliding bars, upon the inner ends of which the thread is cut. By means of a lever operating suitable mechanism the slides are thrown in or out, as it is desired to open or close the die. Both operations are usually made automatic, dependent upon the length of thread for which they are set. In closing the slides are brought to an exactly central position by means of stops, and as soon as the desired length of cut has been reached they are thrown outward, entirely clear of the work, which enables it to be withdrawn without the necessity for backing out or even reversing or stopping the machine. Of course this is a great time saver, and also prevents possible injury to the thread, which is liable to occur with the reversing method, from chips becoming jammed in the teeth. The latter are given considerable angle of cut and clearance to enable them to work freely at the comparatively high speed of rotation desired. While this somewhat reduces their durability it is of but little importance, as the teeth may be recut many times before the slides need to be replaced.

The solid dies used in bolt cutters are carried in a square socket in the head, which, while holding them against lateral motion, allows of perfectly free play in the plane of rotation, which enables them to follow eccentricity of setting of the work. The qualities of the solid die, whether for machine or hand use, are substantially the same. For free cutting, the amount of thread surface should be reduced to the least possible limit consistent with durability. The clearance should be somewhat less than in the releasing die, as the work must be backed out. It is sufficient, however, to admit of very rapid and free cutting. The usual and simplest method of forming the cutting edges and allowing the necessary space for chips is to drill a large hole, far enough back from the bottom of the thread to allow for proper depth of face, and from this hole the intervening metal is cut through and the face and heel of the teeth finished, and the clearance of the latter is then easily accomplished.

Most makes of solid dies, embodying late improvements, are made adjustable within a very limited range of variation—that is, if it be desired to vary the size to cut tight or loose fits to standard taps, or to compensate for wear, by means of several different devices, all of which are very simple and effective. For hand use the open die is used much less than formerly, as the solid form is fitted to the

stocks and used in its stead. The necessary qualities are much the same as in the latter, and should enable the cutting of the full thread to be accomplished at a single operation instead of by the old-fashioned method of turning back and forth and making probably half a dozen passes. The dies should have the faces at the parting and centrally opposite between, the latter being of the form described for the solid die.

All dies, of whatever form or thread, if of large size, are best cut in the lathe, leaving only a light, scraping cut for finishing with the tap, in order to standardize and properly match the threads. Smaller sizes, of course, are made entirely by tapping. The hardening and tempering require to be much the same as for taps, though the manipulation is much less difficult, and the certainty of satisfactory result greater. Pipe taps and dies differ in some respects from the ordinary form, but may be considered as modifications of the general features alluded to. From the proportionately large diameters of the screw, as compared with pitches of threads, the grooving is much shallower in the taps, and the clearance spaces in the dies. For the larger sizes, both taps and dies for machine use are made releasing—the dies similar to the form described—the taps, collapsing into the body, or stock, by means of automatic devices of several different kinds. As these threads are cut in sizes up to about 15½ inches diameter, the tools become decidedly ponderous by the time the limit is reached.

THE WEEK.

More fire arms are needed on account of the frequency of domestic violence, and Gen. Schofield in his report earnestly recommends that no time be lost in providing a full supply of these arms for the regular troops and the organized militia of the several States.

The new steel bark "Unionen," built in Barrow, England, for parties in Bergen, Norway, for the carrying of oil in bulk, just arrived from the yards of her builders, is pronounced to be the finest sailing craft that ever entered the Delaware. She is 6118 tons register, 248 feet long, 40 feet beam, 22 feet deep, and will carry about 850,000 gallons of petroleum.

Rates on West bound freight will be fully restored after the close of navigation.

Canadians appear to be no nearer securing fast transatlantic service than they were four years ago, and the United States having contracted for an independent mail line between New York and European ports, the odds against them are increased.

The Massachusetts Legislature decreed that after November 1 the railroad cars must be heated by steam.

According to the latest trade returns received at the Bureau of the American Republics, the commerce of the Republic of Brazil for the first six months of the current year has amounted to \$37,900,000 gold in imports, against \$33,200,000 last year, and \$66,200,000 gold in exports, against \$63,100,000 in 1891.

The receipts of quicksilver at San Francisco during the last nine months are much larger than those for the corresponding months last year, and prices for export were fixed so low, presumably to unload the market, that several invoices for Australia were returned and sold at a profit for local use.

The Mexican Government has reduced the duty on cooking stoves, to take effect December 1, and imposed a small duty on iron and steel for mining machinery and

agricultural implements, formerly free, to take effect January 1. The tax on American corn is suspended until February 1.

The site of the once famous Morgan Iron Works in this city, where the engines of some of the Collins steamships were built, is now occupied by tenement houses.

Hoine & Son of Lawrence, Mass., have received an order for the widest paper machine in this country, a 136-inch Fourdrinier.

Ten steamers are under charter at Philadelphia to load oil for France. Encouraged by the low prices many new rivals are springing up in the refinery business, and pipe lines are multiplying.

Wrought-iron tubes will be used in the experiment for pneumatic mail transportation in Philadelphia, and the National Tube Works at McKeesport have received the contract.

There are said to be 21 bridges across the Ohio River, 23 across the Mississippi, and 16 across the Illinois, besides many across their navigable tributaries, and prospects are good for building more.

The long-distance telephone to Chicago works satisfactorily, and the prediction is made that before long the human voice will be heard across the continent.

The Indian wheat crop of 1892 is officially reported to be 5,422,000 tons, the smallest since 1884, and the British wheat crop was estimated October 1 to be nearly 10 per cent. lower than the conditions one year ago.

It is announced from Washington that our new commercial treaty with Spain, the negotiations for which have been pending a long time, is ready now to go into effect.

The annual statistics of the Bombay Millowners' Association show that there are now in India 132 cotton mills, of which 88 are in the Bombay presidency. Last year 65 mills consumed 730,000 bales of cotton.

After 13 years of prohibition the Government of Great Britain decides to admit live sheep from the United States into that country and has revoked the order which required that all such animals should be slaughtered on the docks where landed.

Of 60,000 men who are employed in Clyde shipyards when trade is brisk half are idle at the present time. Great Britain has been launching 400,000 tons a year of surplus tonnage for some time past.

The New York Police Department have been allowed \$60,000 for a new boat, the "Patrol" being too slow.

The Naval Board of Inspectors, whose duties are to inspect every American steam vessel coming to this port to determine her capabilities for service as cruiser, transport, or torpedo boat and to inspect and report upon the hull, machinery, &c., of the foreign steam vessels, have transferred their headquarters from the Post Office building to the Navy Yard.

West Point, Georgia, is to have a \$600,000 cotton mill.

The increase in the Treasury net gold fund from \$110,000,000 to \$122,000,000 since the end of July, although so desirable in other respects, has reduced the free margin of funds against which notes of the smallest denominations can be issued, and the Treasury therefore is not now endeavoring to compel the banks to give it more gold.

President McLeod of the Reading Railroad claims to be undisturbed by the latest phase of anti-trust litigation. It is

stated, on credible authority, that in case Chancellor McGill appoints a receiver for the Reading allied lines in New Jersey the company will apply for a Federal injunction forbidding the receiver from interfering with the interstate traffic of these lines.

There have been shipped into Mexico, within a month, 3,000,000 bushels of corn, through Texas.

The whales in the Pacific Ocean are small this year and unable to compete with the oil wells in Pennsylvania.

A careful consideration of all that is implied by the awarding of an American register to the "City of Paris" and the "City of New York" and the mail contracts for ten years to the Inman Company, the *Marine Journal* says, must be a gratifying study for an American patriot. The first and most important proposition is that \$9,000,000 will be expended for American labor and American material. By this expenditure no less than 300 industries will profit. Then the immense sums derived from American trade and from carrying the mails which have annually gone into the coffers of foreign companies will, in a large measure, be saved to the country when the magnificent new fleet is once under steam. All this is the view from the financial standpoint. By no means an unimportant consideration is the privilege which the Government reserves of appropriating the vessels and turning them into commerce destroyers in the event of war. Sumptuous and majestic symbols of prosperity in time of peace, in time of trouble they would be proportionately significant as an arm of the nation's defense.

Southern papers are praising the newly invented Todd cotton picking machine now at work near Dallas, Texas, which does as much in two hours as an average farm hand in a week. The hardest problem in cotton raising is supposed to be solved.

Armour's new beef packing plant in Kansas comprises eight buildings, covering 20 acres, and the machinery and apparatus cost \$2,000,000. The pay-roll contains 20,000 names.

The Philadelphia & Reading has established a new fast freight line out of New York and Boston, with 5000 cars in the service.

At the opening of the Chicago Exposition Mr. Depew spoke of New York as the "center of the financial and industrial activities of the world," and Governor Flower said that "in New York City we have the greatest manufacturing community in the country; and if the circle be enlarged so as to include the wide area of the metropolitan district we have within a radius of 12 miles from the City Hall of New York an aggregation of productive effort which for variety and value can hardly be matched in the world," which every Gothamite will admit was only stating the truth.

Nearly 3,000,000 acres in the Indian Territory, between the Washington and Red Rivers, has been surrendered for settlement for the equivalent of \$2,000,000, and being well watered and fertile is expected to develop into magnificent corn and cotton land.

Next month 60,000 operatives in the Lincolnshire cotton mills in England will probably strike against a proposed 5 per cent. reduction in wages.

The first iron ore from the new Cuban mines in Sigua has just arrived in Philadelphia by the whaleback "Joseph R. Colby," built at West Superior. The mines are on the south side of the island, where the Juragua Company have a break-water and piers.

The Iron Age

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The Columbian Celebrations.

The grandest celebrations of any event on this continent have occurred within the past two weeks. New York led off in its great demonstration on the 12th in commemoration of the discovery of America. It was a fitting prelude to the magnificent celebration of the same event in Chicago on the 20th and 21st. Other cities honored the occasion with more or less pomp and ceremony, but none of them could in the nature of things compare with the demonstrations in the two principal cities of the country. Chicago claimed special distinction in this respect, as it not only celebrated the discovery of the New World, but at the same time dedicated the buildings of the World's Fair to be held in that city next year. The Chicago demonstration was of an official character, gathering as the central figures in the celebration the chief dignitaries of the nation—civil, military and ecclesiastical. It was also international, the leading countries of the world being represented by members of their legations at Washington. Nothing has ever occurred in this country so imposing as the remarkable pageants seen in New York and Chicago within the past fortnight. They are eminently worthy of permanent record in the pages of history, marking the achievements of peace and typifying the progress of good will among the nations.

The citizens of Chicago may well feel proud of the superb manner in which their city sustained itself last week under the critical inspection of the countless throngs of visitors gathered within its walls from the ends of the earth. When Congress formally selected the inland city as the location of the international exposition to celebrate the 400th year of the opening of this continent to European civilization, there was much doubt as to whether the enterprising Chicagoans had not invited a task which would prove too burdensome for them. They were known to be the most indefatigable and aggressively progressive business men on the globe, as shown by their stupendous achievements in promoting the commercial, manufacturing and transportation interests of their wonderful city. The conception of an international exposition, however, was necessarily on such different lines from anything previously undertaken, and required such a vast investment of capital and the sacrifice of so much valuable time on the part of business men with whom time meant everything, while actual results were not to be measured in dollars and cents like ordinary commercial undertakings,

that distrust of Chicago's abilities in such a line was quite excusable. Again, after the work of preparation for the exposition began, it was found that plans were being made on a scale of colossal grandeur, with the avowed purpose of surpassing anything previously done in the way of expositions. This was Chicago-like, but it staggered the outside world, and ominous forebodings were published of the impending fiasco in the Windy City. The time of preparation was deemed altogether too short for such huge buildings, and so many of them to be completed. The critics knew little of Chicago push or they would have waited and postponed their opinions until the facts warranted an unfavorable expression of views. Despite the magnitude of the scale on which the fair was planned, work has been pushed so rapidly that when the buildings were formally dedicated on the 21st they were practically ready to receive exhibits. Installation will begin on November 1, six months before the gates are to be opened to the public.

The visitors to the World's Fair grounds last week saw an almost completed piece of work on a scale much larger than ever before attempted by man for a mere six months' occupancy. They saw architectural creations of stupendous size and yet of almost classic beauty. They saw palaces, which if erected in any monarchical country would have won for their creators decorations if not titles. They saw, complete in its majestic proportions, the largest building ever erected in the world, the immense temporary home of manufactures and liberal arts, covering over 30 acres of ground, and spanned by the largest steel trusses ever erected, with centers at such a height from the floor that great beams seemed like spider webs. They saw under that vast roof the largest assemblage of people ever gathered within the walls of a single structure, estimated at 100,000 and upward. They saw, and they departed convinced that if it is in the power of man the Chicago Exposition of 1893 will be a pre-eminent success.

Some time since, at a meeting of the Master Mechanics Association, the question of the material for locomotive fire boxes came up. One of the leading Western roads had locomotives whose steel fire boxes had shown exceptionally good service, and since they were very old the conclusion was jumped at that the steel must be crucible steel. One of the leading makers of both crucible and open-hearth steel urged the use of the former on the ground of this splendid record, and the opinion was widely accepted that after all, for real hard service, the good old crucible steel fire-box plates were undoubtedly the best. Unfortunately an engineer of an inquiring turn of mind had an analysis made of the alleged crucible steel. A glance at the results showed the characteristics of open-hearth steel, and none of the distinguishing elements of crucible steel. It is probable that the plates were among the first turned out at the old Norway works.

Sir Lowthian Bell on the American Iron Trade.

The long-expected volume to be issued by the Iron and Steel Institute on its American trip in 1890 has at last reached its members. We will frankly admit that we looked forward to it with eager interest, because it was well known that Sir Lowthian Bell was to "describe the economic conditions of the iron fields visited, and convey to the outside world some impressions gathered during this visit to the United States of their present position and future possibilities." We have been sharply disappointed in our expectations, and have been unable, more than once during the perusal of the work, to repress a feeling of resentment. We know that this feeling will be shared by the majority of those who offered the members of the Iron and Steel Institute such lavish hospitality in 1890. Sir Lowthian Bell is entitled to his own opinions, and has a right to express them whenever he can get a hearing, but it is a breach of good manners on the part of the Iron and Steel Institute to let a volume like the one now issued go out with its imprint. We even question whether the council has not violated the rules of the society in the most flagrant manner. The institute was made welcome with the distinct understanding that it was not a body dealing with economic and commercial questions; that it was a purely technical and scientific society. Had American iron masters known on the day when the members landed that their hospitality would be abused as shamefully as has been done, the visitors would have found the doors of every iron manufacturing plant in the country closed against them. That, we venture to say, will be their fate henceforth.

So far as the matter which Sir Lowthian Bell presents is concerned, it will prove very disappointing to American readers, because the expectations are not realized that he would present comparative data. The descriptions are fair compilations, with little or no critical comment as to resources or methods. The economic data are merely a rehash of the census reports and the documents issued by Carroll D. Wright. Even where the latter's figures are so lamentably inadequate in dealing with the English industry, Bell does not fill the gap except in a few isolated cases. It might have been expected that if he were about to build all his arguments upon the flimsy basis of Mr. Wright's European figures, he would have taken pains to fortify himself with original data. In this respect his production is unworthy of him, and he has distinctly lowered his reputation as a writer on metallurgical subjects.

His final conclusions are that ultra-protectionists have no business to be angry at the quantity of foreign iron which has from time to time been landed on American soil, and that the older seats of the American iron trade cannot compete in the export trade with Great Britain except to countries close at hand. We fear that the aged metallurgist has failed to read the

signs of the times, and that he does not appreciate the ambition of American iron makers.

They do not expect to send out pig iron or bars. They want to market iron and steel in its full line of finished products. They are even now gaining, and may look hopefully into the future, since the substitution of wrought iron for steel is powerfully aiding them to come closer to foreign costs.

English iron manufacturers have never displayed any great joy over the control of their own home markets in I beams by Belgian and German makers. They have been just as doubtful of the ability of Continental producers coming into their foreign markets until lost trade brought conviction. A few years since American iron manufacturers had all they could do to secure their own rapidly growing market. They have it now and will keep it, and must then look forward to capturing a goodly share of the world's trade. It will be done, while English authorities are proving to their own satisfaction that it is impossible.

The Rise in Silver.

The American delegates to the International Monetary Convention will consult with the President on November 10 and sail from New York on the 12th. Many unpartisan papers predict that the conference will be productive of results that will enlarge the use of silver as currency.

One of the most important events in the financial world last week was the advance in the price of silver. The minimum was reached in August, it being 82½ cents per ounce. It gradually crept up to 84½ cents, the point touched October 8. In the interim to October 15 it reached 87½ cents. On Monday it touched 87½ cents, and the day following sold off to 86 cents. The movement was due to the actual shortage in London brought about by the India Council holding their bills. This resulted in large shipments of silver from New York to London seven weeks ago. The amount aggregated 2,000,000 ounces of bullion. No such shipment had occurred from New York to London in two years' time. A similar movement went on from London to India, so that when a speculative current set in it found the current supply of silver hardly equal to the demand. The United States Government's purchases absorbed a portion of the remaining local supply, leaving very small stocks on hand. This relieved the market, so that the prospects are decidedly brighter. There is not much probability of any one sacrificing silver at the present time, while there is evinced something of an inclination to hold it.

We are informed by one of the largest silver producers and smelters of the country that the recent low quotation did not in any manner decrease production. A mine is an elaborate piece of machinery. To stop it means a vast amount of expense and no revenue. The depression would have to be of long duration, and present no prospect of immediate improvement, to induce such action. Again, the profit in

operating a mine lies in a maximum output. To curtail this without stopping would mean a loss of net revenue. Our informant states that the output during the month of August was the largest of the year. This he attributed to favorable climatic conditions.

The silver producers of the Rocky Mountain States and Territories have dinned their laments into the ears of any one willing to listen. They have predicted again and again that a large portion of the working population would be robbed of the means of livelihood unless silver were taken care of. That their pleadings were exaggerated is pretty thoroughly proven by the steadiness in the production of silver in the face of low prices.

The Critical Condition of Europe.

The condition of Europe is always critical, if newspapers are to be believed. But there are indubitable signs at the present time more portentous than usual of a crisis that may be impending not far in the future. In the United States the possibility of another European war no longer excites apprehension, nor scarcely excites remark, further than may be suggested by the ominous allusions by several foreign correspondents of the daily press to warlike preparations. Even the disavowals on the part of emperors or military leaders of any hostile designs are regarded with distrust, or at least as susceptible of a double interpretation. Nevertheless, another disturbance on the Continent may reasonably be kept in mind on this side of the Atlantic as a possible contingency with reference to future business engagements. The subject cannot escape attention so long as the leading European governments continue enormous expenditures in the perfection of their naval and military establishments, and contemplate still further increase. At the present moment Germany is profoundly agitated by the endeavors of the Emperor to provide for fresh levies of troops; and this at a time when retrenchment seems to be earnestly demanded by considerations of State policy. So closely related are the commercial interests of Europe and America, as indicated by the tremendous volume of international commerce and interchange of securities, that no prudent business man in the United States can well remain oblivious to the struggle of Germany, Russia and France for military pre-eminence. Already the tension of taxation is severe almost to the limit of endurance, yet the demand for more armaments involves vastly increased expenditure, estimated at from \$18,000,000 to \$20,000,000, in order to place 75,000 more men in the barracks for annual training. The Austrian contingent, it is rumored, may be increased proportionately. A stimulus is doubtless desired from the alleged discovery that the Germans are outnumbered by France in the forces available to take the field. One report says the French preponderance is equal to two army corps, besides any number of big guns and no lack of ordnance and military materials.

The inference is warranted that Germany does not feel secure, menaced by such a display of numbers and military preparations, which have been incessant, whatever changes of ministry may have occurred, from time to time.

After speaking of the present financial embarrassments of the emperors of Germany and Austria and the difficulties of their political environment, as well as the hopelessness of aggrandizement by the further extension of territory, the London *Economist* says:

If, therefore, these emperors and their advisers agree that the new demands must be made, it must be because they foresee war in the near future, and have become aware of facts which make even the gigantic preparations of the past seem to them inadequate. They must know, in fact, that Russia and France are straining every nerve for superiority in armaments, and that to abstain from equaling them, or even to delay equaling them, would be culpable imprudence. It comes to this, then, that the two best-informed persons in Europe on this subject do not think peace by any means assured, and are prepared to convince unwilling parliaments by facts and figures that the insecurity is great enough to justify or, indeed, to compel further heavy sacrifices.

If these conclusions are correct, then it follows that while actual hostilities may be far in the future, it is quite possible that conditions exist that endanger the peace of Europe, known only to those most favored with opportunities for observation. Certainly there must be substantial reasons for disregarding the clamor for retrenchment lately heard in all the parliaments on the Continent. The fact, if it be a fact, claims consideration among those factors which should enter into deliberate and comprehensive business calculations either in Europe or America.

While consumption in other branches of the iron trade is very large, and, in spite of very narrow margins, the business is in a sound and healthy condition, the steel rail trade is languishing. At the rate at which business is now coming in the shipments of standard sections will not be much over 1,300,000 gross tons, to which, of course, must be added the relatively large product of light sections and steel rails, which forms a business by itself. The prospect for the future, so far as the consumption of standard rails is concerned, is by no means promising. It looks as though 1,000,000 tons annually will cover the requirements for renewal, that part of the demand being fairly steady. What may bring pressure, of course, upon the mills is the quantity needed for new construction. At the rate at which we are now adding to our mileage 300,000 tons seems to cover the demand from this source. The condition of the railroads financially and the attitude of investors toward new issues of railroad bonds leave little hope of additions to mileage beyond a maximum of 5000 miles, with the chances for next year in favor of 3000 miles. This is not enough to keep the existing mills running at more than a very moderate speed. Since the unit of profitable production has been increased during the past decade, while the maximum re-

quirements have fallen off, it would seem as though even the small number of concerns in the business now is too large. The signs of the times point to a further concentration of this great interest. With a part of the rail capacity unemployed the constant addition of new plants in the soft steel trade seems like a waste of capital.

The announcement made last week that one of the contracts for the construction of superstructure of elevated work in Brooklyn had been taken at close to 3 cents, erected and painted, has been received in the trade with some surprise. Still, before the figures were in, there were those who predicted that 3 cents would not be far out of the way. Putting in the material at 2 cents delivered at works, which is not low, and counting 25 to 30 cents for freight, hauling, riveting and painting, there is left 70 to 75 cents to cover the cost of shop work, waste, accidents, contingencies, interest, engineering and profit. That under the circumstances the latter is likely to be a moderate one few cognizant with the industry will be prepared to deny. The low first cost of such structures at the present time cannot help having its influence in notably increasing the consumption of iron and steel. The beginning in elevated approaches of railroads in our large cities has been made. The system is bound to grow, thus furnishing the mills with a good deal of business.

The frequent assaults upon workmen at Homestead show pretty thoroughly that the members of the Amalgamated Association and their allies have learned nothing during the past three months. The officials of that body should prove that their professions are not mere cant. Let them expel any member who is convicted of having done bodily injury to outsiders. The helplessness of the local authorities is again pretty well being proven, when it comes to catching and locking up union men who break the peace. It will be astonishing what vigor is suddenly displayed when some one of the non-union men who is being subjected to "moral suasion," avails himself of his privilege to use fire arms. The Homestead strikers should remember that not long ago a Pittsburgh judge decided that any man has the right to shoot any person who interferes with him when he is on his way to or from work.

Weimer & Sheridan, of Duluth, Minn., who leased a portion of the holdings of the Ohio Iron Company some months ago and organized the Ohio Mining Company, have transferred their lease to P. B. Kimberley & Co. of Sharon, Pa., in consideration of a bonus of \$105,000 in cash. Their contract with the Ohio Iron Company contained provisions obligating them to mine a minimum of 150,000 tons of ore a year and pay a royalty of 65 cents a ton for all ore taken out. They were also obliged to pay \$15,000 in advance royalty. Mr. Kimberley agrees to fulfill the terms of the original contract and pay Weimer & Sheridan a cash bonus of \$90,000 clear.

Washington News.

(From Our Regular Correspondent.)

WASHINGTON, D. C., October 25, 1892.

Secretary Tracy has expressed himself again very decidedly on the subject of the delay in the furnishing of the barbettes 10-inch plates for the "New York," and has sent an officer to make an investigation of the actual situation and outlook. But for the supply of 4-inch water belt plates the work on the cruiser "New York" would necessarily have to be suspended to await this material.

The Bethlehem plant will be utilized for bending the armor into shape, the Carnegies not having the machinery capable of manipulating the 10-inch plate.

The Secretary had expected that the "New York" would be ready for trial next month. The non-supply of armor will now prevent this consummation until January of the coming year. Commodore Folger, Chief of Ordnance, whose untiring zeal has done so much to bring American armor up to its present unrivaled standard, regards the recent tests of Bethlehem Steel Company nickel steel as a consummation far beyond anything achieved by England, Germany or France. On last Saturday a 14-inch plate of Bethlehem nickel steel, the heaviest armor yet made to be used on the battle ships, was tested at Indian Head. Ten-inch Holtzer and Carpenter armor-piercing shot scheduled for 15-inch penetration of the best armor steel were used. The plate not only resisted the shot but fairly crumbled them into fragments.

The American navy can now also boast of the undisputed leadership in the armor making branch of war shipbuilding. It has already fairly eclipsed all others in hulls, engines and guns. The naval experts have been watching with deep interest the progress of the negotiations for the transatlantic mail service with the new American International Steamship Company. The construction of five additional American built steamers for \$9,000,000, to run in the same service and in competition as to merits with the English built American registered "City of Paris" and "New York" will mark an important era in the world of maritime rivalry and energy, as between the United States and England.

Naval men say that the American built will so far surpass the English built ships in the same line, that the result will give a great impetus to Americans as the shipbuilders of the world.

It will also correspondingly extend the demand for the superior American steel. The opinion is expressed that the achievements of metallurgical industry will surpass in the next few years anything yet accomplished, and place the United States in the lead in these branches, as they are already in pig iron production.

Advices from the Connellsville region indicate that the coke trade is showing visible signs of improvement, both as regards production and shipments. Within the past six weeks over 3000 idle ovens have been fired, and production has risen from 91,000 to 112,900 tons per week. Shipments are also increasing, but are seriously retarded owing to the car shortage which has existed in the region for some time. For the week ending on Saturday, October 15, 13,557 ovens were in blast, and 3696 were idle, the total estimated production being 129,983 tons. Compared with the production of the previous week, this is an increase of 13,730 tons. For the week ending on the above date 718 ovens were put in blast at the following places: 146 at White, 33 at Leisenring No. 3, 50

at Kyle, 195 at United No. 2, 15 at Calumet, 124 at Redstone, 20 at Hecla No. 1, 35 at Hecla No. 2, and 100 at Lippincott.

San Francisco News.

October 17, 1892.

I have at various times during the past few months kept the readers of *The Iron Age* posted as well as circumstances would admit on the movements of the Fulton Iron Works of this city. I did so on account of the importance of the institution in the industrial world of San Francisco and the much greater promise of its future, as also because the example afforded of an increase of facilities and an extension of its sphere of usefulness looked as though it were about to become contagious. I have now to say that the new works will be built neither at Baden nor at Oakland, but probably at North Beach. I say probably, because the numerous changes of base made after it was given out that work was actually begun have made me cautious. It is now given out that the reason that location was not made at Oakland was because title could not be had. This, of course, immediately put a stop to further proceedings, much to the disgust both of the owners of the Fulton works and the good people of Oakland. The Southern Pacific laid claim to the whole of the water front and the courts have at last decided in their favor, so that the company can hardly be blamed for this change of front. Now Jas. G. Fair, our noted capitalist and Bonanza man, has made them an offer of a piece of land at North Beach in this city and they have availed themselves of the offer. Mr. Fair has taken 1500 \$100 shares in the company in part payment for the land. A new company was formed the other day with a capital of \$1,000,000. Besides Mr. Fair and the original owners of the foundry, a couple more iron men have also subscribed, so that the whole business has been placed on a broader foundation than hitherto. The fact that Mr. Fair, one of our richest capitalists and already heavily interested in the Pacific Rolling Mills, has taken hold in the matter augurs well for its success. He has a great opinion of the future of the iron business in this city, and in fact the prospects now are brighter than they have been for long years past.

There has been quite a revival in business here of late, and the improvement that I referred to in my last still continues. There is apparent a better spirit on every hand. The outlook for the wheat market is better than it has been in many months, and after all wheat is the great staple of California, though in many places it has been superseded by fruit, while in others fruit has taken the place of sheep raising and wool growing. Still if wheat growing were to be blotted out in California, there would be left a void that could not easily be filled. It will therefore be seen that when matters are well with the wheat grower the dealer in iron, hardware and agricultural implements rejoiceth, and I doubt much whether wheat will ever be entirely supplanted by anything else. Country dealers are beginning to order more freely than for a good while past; but in this, as in other things, the Eastern drummer is making his influence felt more every day. Here the good effect of cheap freights by sea will be more especially felt, as they will enable our San Francisco merchants to contend for the trade of the coast with their Eastern competitors on something more like equal terms. The clippers arriving from the East of late have been heavily laden, and hardware, iron and steel have formed a great part of their cargoes. The "St. Francis," the "Berlin" and the "Bohemia" have come to hand of late with very large and important cargoes, including a very large

assortment of hardware, iron and steel, wire, &c., but no pig iron; in fact, our receipts of pig iron of late have not been large from any source. Matters in the foundry section have been dull. Prices remain the same as I last advised you.

Cruiser No. 6 will be launched on November 5, and is thus in a state of forwardness. Like the vessels recently built at the works, she has been built with considerable rapidity, and everything about her testifies to the skill that has been acquired by our Pacific Coast builders. I think that I am within the mark in saying that San Francisco can build a vessel of any size or description as rapidly and well as can any shipbuilding center in the world. The new cruiser will be a truly magnificent vessel.

There is little or nothing moving in the direction of pig tin or tin plate recently, and there have been no changes in prices. There have been no arrivals of any importance.

Arrivals by rail for the past two weeks have been somewhat of an improvement on the same period just preceding. They embraced 60 cars, including 9 cars of iron, 1 do. of steel, 4 do. of hardware, 11 of machinery, 5 of stoves; 7 of agricultural implements, 5 of safes, 5 of wire, 1 of mantels, 1 of plates, 6 cars pipe, 1 car plows, 1 do. harrows, 1 do. cable, 1 do. ranges, 1 do. nails, 913 plates spelter, 3680 pounds copper.

Quick Furnace Relining.

It is quite a number of years since Thomas G. Davis, manager of the Phoenix furnace of the Brown-Bonnell Iron Company, Youngstown, abandoned the old-time custom of what is called "blowing out." Instead of blowing to reduce the ore in the furnace, and wasting coke for two or three days, he shuts off the blast and drowns out the furnace with water, and then shovels out the stock without waste, as the stock so taken out can be utilized after the furnace is in blast again. He no longer employs the sweep as used by furnace builders. The sweep is a center pole, pivoted in the center of the furnace stack, and to which is fastened an arm of such length as to sweep the proper diameter to which the bricklayer lays his brick. This method is a very tedious one, as the arm and pole are always in the way of the workmen, and prevent them from keeping a supply of brick upon the scaffold. Delays in waiting for material are frequent. Instead of following the plan described, Mr. Davis simply suspends cords from the top of the well to the top of the bosh, three or four feet apart. This serves as a sufficient guide to the bricklayers. The scaffold is kept free from all obstructions excepting the stock brick. In this way a greater number of men can be worked.

Phoenix Furnace went out of blast on September 6, 1892, at 5.30 p.m. The work of drowning it out immediately commenced. It was shoveled out and was ready for the bricklayers on Tuesday, September 13. Further operations were delayed until Monday, October 3, upon which date the bricklayers commenced work at 10.30 a.m., and finished on Saturday, October 8, at 9 a.m. On the same afternoon the bell and hopper were put in and drying commenced. The furnace was ready to light on Thursday, October 13, but was delayed until Sunday, 16th inst., upon which date it was lighted up at 7.15 a.m. The first cast of iron was obtained on Monday morning, 17th inst., at 2.30 o'clock, the weight of iron for Monday being 35 tons. During the delays above mentioned work was entirely suspended. The furnace averages 115 tons per day the year round. It has two (pipe) hot blasts and one engine.

OBITUARY.

A. C. KIRK.

Dr. Alexander Carnegie Kirk, senior member of the firm of Robert Napier & Sons of Glasgow, Scotland, died of heart failure on the 5th inst. Dr. Kirk was best known in this country for his intimate association with the development of the modern marine engine, he being the first to make triple-expansion engines commercially successful by applying them to ocean vessels.

He was born 62 years ago at the Manse of Barry, Forfarshire, of which parish his father was minister. He first attended the Burgh School, Arbroath, from which he went to the University of Edinburgh where he distinguished himself in the departments of mathematics and natural philosophy. His first practical work was as an engineer in the famous works of Robert Napier, of which he was destined to become senior partner. The value of the training he had received is evidenced by the fact that on the completion of his apprenticeship he became chief draftsman of Mandslay, Sons & Field who then, as now, were largely associated with the construction of warship machinery. For some time, however, he was destined to be chiefly occupied in another field than that of marine engineering, for, after a few years in London, he recrossed the border to fill the post of engineer at the great paraffin oil works of Young, Meldrum & Binney, Bathgate, where he had abundant opportunities for the exercise of his ingenuity, in the design of apparatus and machines of all kinds for facilitating work and economizing labor. The best known of his inventions were his cooling and freezing machines, which were designed in the first place for the purpose of separating the solid paraffin—which is held in solution in the oil up to a certain point—but which afterwards received a much wider application. These machines were the direct results of his studies in heat and thermodynamics, for they depended on principles which could only have been thus learnt, and although they are now largely superseded by others of an improved design, it was Kirk's work which opened up the field and led to future developments.

Mr. Kirk, at the age of 35, returned to marine engineering as manager of the Center street works of Elder & Co., shortly after the death of John Elder, and in the remaining 28 years of his life he devoted himself almost entirely to marine work. Perhaps the branch with which he was most closely identified was the development of the compounding principle as carried out in steamers by Elder. In 1874, when he was with Elder's firm, Messrs. Dixon, of Liverpool, anxious to obtain greater economy of fuel, made up their minds to fit their new steamer, afterwards so well known as the "Propontis," with high-pressure water tube boilers on Rowan & Horton's patent, and in designing the engines, Mr. Kirk had to devise a means of efficiently using the high-pressure steam. As he afterwards expressed himself, he was thoroughly convinced that the great success in the ordinary compound engine of that day over the simple engine lay in the range of temperature through which the steam in any one cylinder passed in the course of one stroke being very much reduced—nearly half, in fact—compared with the single cylinder; and it seemed to him that with the higher pressure he must use three successive expansions and divide the total range of temperature into three parts. This, too, would secure a more uniform distribution of strains, reduce leakage past valves, &c. And on this principle were the engines of the "Propontis" constructed in 1874, hav-

ing three cylinders and three cranks. The boilers, however, did not work well, so that it was only when ordinary boilers were put in that satisfactory results were obtained.

In 1877, shortly after the death of Mr. Robert Napier, he severed his connection with the Fairfield establishment, and, in connection with John and James Hamilton, he acquired the business of his old master, and he thus found himself in a position of freedom to carry out his own ideas. The long list of vessels which he built for the British and foreign governments and for the merchant service, the details of which are well known to all who have any interest in marine engineering and naval architecture, showed that the confidence which had been bestowed in the firm of Napier in former days was continued under the new partners.

Valley News.

It is stated on good authority that the Alice furnace at Sharpville will soon be put in blast. New scales are being built for the purpose of weighing the molten metal, which will be transferred in cars to the West Foundry for making ingot molds.

The Sharon Boiler Works, Sharon, Pa., have a large force of men at Spring Valley, Wis., erecting a set of boilers for a large charcoal furnace about to be started.

It is quite probable that Youngstown will in another year have a belt line railroad. The leading business men of that progressive city are handling the project, and considerable capital has been subscribed by the various manufacturing concerns of the city. Youngstown has the best railroad facilities of any city of its size in the United States. The four great trunk lines pass through it—the Lake Shore, Pennsylvania Company, Erie Railway, Baltimore & Ohio, and Pittsburgh & Lake Erie and Pittsburgh, Painesville & Fairport Railway. With a belt line railroad the city will have the best railroad service possible.

The Falcon Iron & Nail Company's tin-plate works at Niles, Ohio, will be ready for operation early in the spring. The buildings are well under way, and the orders for machinery and equipment have all been placed.

The Sykes Steel Roofing Works of Niles are working on large orders for roofing and siding. There is a large demand for their product.

The Youngstown Bridge Company are erecting a new iron roof for the stock house of Girard Iron Company's furnace.

The Mahoning Valley Iron Company are making extensive repairs at their Hubbard mills.

A new lining has been put in Phoenix furnace of the Brown-Bonnell Iron Company, Youngstown. It was done in two weeks' time.

Enterprise Boiler Company, Youngstown, Ohio, are making two portable boilers for Evans City, Pa., and a new hearth and bosh for Tod Furnace, Brier Hill, Ohio.

The Hamilton Works of Wm. Tod & Co. are building two blowing engines for Tod Furnace of Youngstown Steel Company. These engines will have cylinders 42 inches in diameter, air cylinders 84 inches and 60-inch stroke.

Cooper Gear Works of Struthers, Ohio, have orders for 10,000 buggy gears.

A photographic paper for copying tracings, which gives black lines on a white ground, is being placed on the market by Schwenke, Kirk & Co. of this city. Not only has the paper the obvious advantage over blue prints of giving more suitable colors for the ground and lines, but it re-

quires no other treatment after coming from the printing frame than a simple immersion in a water bath. The price of the paper is not any higher than that of the best quality of blue print, and its use entails no expenditure on chemicals for developing.

The United States Car Company.

Judge Lacombe in the United States Circuit Court has approved of the sales of certain equipment of the insolvent United States Rolling Stock Company made by Receiver Wm. C. Lane to the Committee of Reorganization in the interest of the succeeding corporation, the United States Car Company. Following is given the location of the property and the amounts involved: At Anniston, Ala., \$67,607; at Urbana, Ohio, \$3003; at Hegewisch, Ill., \$51,106.

David Cornfoot, chairman of the Reorganization Committee, informs an *Iron Age* reporter that the new company upon approval of the court have leased the plants at South Chicago, Hegewisch, Urbana, Anniston and Decatur, pending a foreclosure of the mortgages thereon, and will commence operations within a week or ten days, and propose to re-enter the markets and win back the old trade.

Trade Publications.

THE BAILEY-FARRELL MFG. COMPANY of Pittsburgh have issued a small volume describing the Theory and Practice of Lead Burning by the Autogenous Process. It describes the apparatus used by them for generating hydrogen; the aerometer for supplying atmospheric air to the hydrogen gas blow pipe, and the method of adjusting the flame. This is followed by a very complete and plain description, accompanied by engravings, of the way to use the flame in making different kinds of joints. Concerning the theory of lead burning it is said: The learner having a knowledge of the non-oxidizing flame has no trouble in making a flat butt or a flat-lap seam, as he finds that the law of gravitation assists him, as the drop of melted lead remains on the flat seam where melted, and submits itself to the laws of adhesion and cohesion, which at once seize on the drop of melted lead and dispose of it in the exact spot to make a perfect seam. Not so on the horizontal and upright seams. Here we have a disagreement or a fight between physical agents and natural forces. Gravitation says to the melted drop of lead on the upright seam: You are wanted at once; come with me to the center of the earth. Cohesion and adhesion say to the melted drop: We will hold you with all our strength; do not leave us. The expert lead burner takes advantage of the properties of the molecular forces of cohesion and adhesion, which forces, when combined with the force expended by the flame issuing from the blow-pipe jet, are of sufficient strength to hold and manipulate a melted drop of lead of a certain size to the proper point of junction on the upright or horizontal sheet-lead seam.

THE LIDGERWOOD MFG. COMPANY, New York, will soon publish for gratuitous distribution a 40-page pamphlet, illustrating with a number of finely executed half-tone plates the Lidgerwood Rapid Unloader—a new device used for plowing dirt, ballast, gravel, sand or other material off of flat cars. The Rapid Unloader has been used for the past year, and the manufacturers have sold the following machines: To the Drake & Stratton Company, Limited, six machines; Adirondack & St. Lawrence Railroad, three machines; and to Lake Shore & Michigan Southern Railroad, Terminal Railroad Association of St. Louis, and Lehigh Valley Railroad, each one machine.

THE UNITED STATES IRON & TIN PLATE MFG. COMPANY, Demmler, Pa., distribute a very tasteful little circular, and one that contains, too, much interesting and valuable information for users of sheet metal. The little pamphlet measures but a few inches in size, bound in paper with patriotically decorated front cover. The first few pages are devoted to the different brands of sheet iron made by

this concern, reference being also made to United States black taggers. Then come tables of the new and old Birmingham gauges; also a gauge in use by the Amalgamated Association of Iron and Steel Workers, which has been recommended to Congress for adoption as the United States standard. Likewise an amendment suggested by conference between the roofers, the black and the galvanized-iron makers. These tables are fully explained and their advantages pointed out. Other interesting tables are presented. The latter part of the pamphlet is given up to tin plates, special attention being directed to United States bright tin plates, described as heavily and uniformly covered, and guaranteed to do any kind of seaming. The three grades of terne plates noted are the United States Eagle, Redipped and Monongahela. All of these roofing plates are squared and stamped with the trade-mark. The manufacturers make a special point of the fact that their plates are coated by the oil process, and they present on opposite pages accounts of the oil and acid processes of tinning, for the purpose of showing that plates made by the latter method are inferior. The closing pages present tables of sizes, weights and prices of their tin plates. Dripping and bread pans are also alluded to in the pamphlet.

Cereal Production of the United States.—The Superintendent of Census has issued the preliminary statistics of cereal production in the United States, prepared under the direction of J. Hyde, special agent in charge of the statistics of agriculture. The figures of the last census compared with 1880 are as follows:

	Census 1890.	
Barley	Acres. 3,221,099	Bushels. 78,349,602
Buckwheat.....	838,777	12,130,688
Corn	72,076,074	2,124,559,312
Oats.....	28,297,272	800,198,797
Rye.....	2,171,622	28,422,354
Wheat.....	33,574,341	468,306,778
Total.....	140,179,185	3,530,967,511

	Census 1880.	
Barley	Acres. 1,967,727	Bushels. 43,997,495
Buckwheat.....	848,389	11,817,327
Corn.....	62,368,594	1,754,591,678
Oats.....	16,144,591	407,858,969
Rye.....	1,842,233	19,831,593
Wheat.....	35,430,333	459,483,137
Total.....	118,631,777	2,697,580,229

Some of the foreign steamship lines will resume their steerage traffic next month.

The Roebling Works at Trenton, N. J., have notified the officers of the Broadway Railroad Company that the cable which is to replace horse-power in this city is ready for delivery, and it is expected that the whole line will be in operation in January. The heavy machinery in the power house at Sixth avenue and Fifty-first street will be tested as soon as the boilers are placed in position.

The largest paper machine ever made in this country has been ordered of Horn & Son, Lawrence, Mass., by the Niagara Falls Paper Company. This will be a 136 inch Fourdriner machine, and is to be completed and set up before February 1 next. The largest machine in England is said to be 150 inches wide. The previous largest one in this country is 135-inch machine.

The report of R. N. Haseltine, the Chief Inspector of Mines of Ohio, shows that there were 859 mines in the State in the year 1891, 802 of which were in operation, a gain of 78 over the preceding year. During the year 62 new mines were opened, 76 remained suspended and 67 were either marked out or abandoned. The coal tonnage of the State was 15,050,187, exceeding that of the preceding year by 1,231,335 tons. The production of iron ore amounted to 67,930 tons, of which amount 15,540 tons were of the black band and 52,440 were of the hematite variety. The decrease in this industry during the past year amounted to 101,104 tons.

MANUFACTURING

Iron and Steel.

The Etna Foundry & Machine Company have been incorporated at Warren, Ohio, with a capital stock of \$50,000. They succeed the Etna Machine Company formerly conducted by the Lloyd Booth Company. The plant will be improved for the manufacture of rolling-mill and tin-plate machinery.

The Muncie Iron & Steel Company of Muncie, Ind., have been incorporated with \$50,000 capital, and the contract let to the Indiana Bridge Company of Muncie to make their iron buildings.

Peter A. Wagner of Oakland, Cal., has been appointed receiver for the California Iron & Steel Company, and has qualified in the sum of \$10,000.

Tidewater Steel Works, Chester, Pa., are stated to have a large demand for their new box rails with chairs and ties, for street railway service. Their material has been supplied to numerous lines both in the Eastern and Western States, and the Tidewater mill is now busy rolling these rails to fill a large order for the Brooklyn Electric Railway.

It is probable that the Bay State Furnace, at Fort Payne, Ala., will be torn down and removed to Chickamauga, Ga. This furnace was partially built by the Fort Wayne Coal and Iron Company before their financial trouble. The furnace is a small one, only 13 x 60 feet.

In accordance with a decree of Judge Bruce of the Federal Court at Birmingham, Ala., the works of the United States Rolling Stock Company at New Decatur and Anniston, Ala., will be sold November 7, unless the sum of \$1,185,000, the amount which they owe the Central Trust Company of New York, is paid before that time.

Active preparations are being made at the Gadsden, Ala., Furnace, Nixon Brothers, lessees, and it will go into operation on the 24th or 25th inst.

The iron furnace of the Norton Iron Works at Ashland, Ky., which has been idle the past year, has resumed operations.

It is stated that the furnace under construction at Piedmont, Ala., will be purchased and completed by the Augusta Mining & Investment Company of Cedartown, Ga., and that they will also lease the furnace of the Cherokee Iron Company at Cedartown.

The blast furnace at Rising Fawn, Ga., is to be repaired and put in blast by the lessees, the Georgia Mining, Mfg. & Investment Company.

The repairing on the Victoria Furnace at Goshen, Va., is being rapidly pushed to completion by the Virginia Iron & Railway Company, and they will go into blast at an early day.

The initial operations of the Penn Steel Castings Company of Chester, Pa., have, we learn, proved highly successful. Five heats have been made from their new open-hearth furnace with entirely satisfactory results. The renovated works are fast getting into good working shape, and are well equipped in every way.

The Ellwood Steel Company, which concern are erecting a plant at Ellwood City, Pa., for the manufacture of sheet steel, have already let the contracts for their buildings and machinery. Two main buildings will be erected, one being 120 x 60 feet, and the other 80 x 140 feet in size. Light steel sheets will be manufactured suitable for tinning purposes.

Douglass Furnace, formerly operated by Pierce, Kelly & Co., at Sharpsville, Pa., but now operated by the Douglass Furnace Company, is doing some excellent work. The average output is 135 tons per day, and it is claimed the consumption of coke is only 1700 pounds to the ton of iron, which is remarkably low.

Machinery.

The Ball Engine Company of Erie, Pa., have taken a contract for four engines of 300 horse-power each for the Suburban Electric Railway Company of Chicago.

Thos. T. Wood has broken ground at St. Joseph, Mich., for a \$10,000 machine shop and foundry.

It is stated that Geo. W. Miller, president of the Buffalo Car Mfg. Company, has purchased land at Buffalo, N. Y., for a large car wheel works. The company, which have already been organized, will be known as the Buffalo Wheel Foundry Company. Extensive works will be built at once, and employment given to a large number of people.

The Bingall Iron Works, at Medina, N. Y., have been partly burned. The loss is estimated at \$20,000.

The Thos. D. West Foundry Company, Sharpsville, Pa., late of Cleveland, are now building an extension of 100 x 130 feet to their plant. It is claimed that, when completed, this will make it the largest works in this country making a specialty of manufacturing ingot molds.

The Jackson & Woodin Mfg. Company of Berwick, Pa., have placed the contract for the new car wheel foundry with the Berlin Iron Bridge Company, of East Berlin, Conn. The building will be from the designs of the Berlin Company, entirely of iron.

The Campbell & Zell Company of Baltimore, Md., have just been awarded the contract for 1700 horse-power Zell Improved Water Tube Safety boilers for the electric light plant to be used in lighting the Auditorium Hotel at Chicago, which will be the largest isolated electric lighting station in the United States. They have also recently closed contracts for a number of smaller plants, including a 50 horse-power high-pressure boiler for the Mechanical Department of the Delaware College at Newark, Del.; one 75 horse power boiler for D. Klotz & Co., New Orleans, La.

Godfrey Rebmann & Co. of Standard Iron Foundry, Philadelphia, have just inserted a complete electric light plant in their establishment; and also a new Box & Co.'s traveling crane for use in the foundry.

Powell Planer Company, Worcester, Mass., are running night and day on orders. Among the shipments recently made is one of twelve frog planers to the Pennsylvania Steel Company. Other large orders for machines of the same class are under way.

Whitcomb Mfg. Company, Worcester, Mass., makers of machine tools, are erecting a brick building at the corner of Gold and Sargent streets. The new plant is 165 x 56 feet, two stories, with wings for offices and a blacksmith's shop. It will be completed about December 1.

The Westinghouse Company are going into the manufacture of refrigerating machinery.

The Stark Machine & Tool Company of Buffalo, N. Y., have just completed a series of heavy riveting presses for riveting the end of band-iron hoops together. These machines head all the rivets in the hoop at one blow, doing the work in about one hundredth the time required for riveting them by hand. The machines are of massive proportions, and weigh about 3500 pounds each.

Mason Regulator Company, Boston, Mass., are erecting an addition to their factory at Milton, Mass., 80 x 40 feet, to accommodate their new departure, boiler feed pumps, which they are preparing to manufacture. A large amount of fine machinery adapted for this class of work has been ordered.

Davies & Thomas, founders and machinists, of Catasauqua, Pa., have received the contract for manufacturing the pulleys and shafting for the 20 miles of traction railway which is being completed in Baltimore. In addition to the above they have already commenced on the work for the Underground Electric Railway to be built at Washington, D. C.

McLanahan & Stone, proprietors of the Gaysport Foundry at Hollidaysburg, Pa., recently shipped to the Solvay Process Company at Syracuse, N. Y., a coke pusher of a new and improved design to be used for discharging coke from a Belgian oven. The Solvay Process Company are experimenting on the manufacture of by-products in coke production.

The extensive works which the Bucyrus Steam Shovel & Dredge Company of Bucyrus, Ohio, are building near Milwaukee, Wis., are nearly completed and will be ready for occupancy early next month. It is probable, however, that the removal will not take place before next year, since the company have orders on hand which must be completed before the change is made. Among these is an elevating dredge to go to Mobile, Ala., which is said to be the largest ever made and which will cost between \$80,000 and \$90,000. The property on which the new plant is located, now known as South Milwaukee, was vacant land a year ago, but now has a population of more than 2000 people.

Painter & Son are erecting an addition to their Myerstown, Pa., foundry, 24 x 140 feet in dimensions.

The molding department of the Stearns Mfg. Company at Erie, Pa., has been damaged by fire to the amount of \$7000. The main structure escaped damage.

The Rice Machinery Company of Chicago have removed from 63 South Canal street to larger quarters at 166 to 174 South Clinton street, the change being necessitated by their rapidly growing business. They carry in stock

a large assortment of shafting, and are general agents for the Dodge Mfg. Company's patent wood split pulleys, of which they also have a large stock. The company make a specialty of the transmission of power in all its branches.

The Walburn-Swenson Mfg. Company having moved to Chicago Heights, are offering for sale the buildings occupied as a machine shop at Fort Scott, Kan.

The foundry of Noyes & Goddard, at Waterville, Maine, has been destroyed by fire at a loss of \$10,000 in patterns, castings and raw material.

The Menominee Iron Works have been incorporated at Menominee, Mich., with a capital stock of \$25,000. A large machine shop and foundry will be erected at once.

Miscellaneous.

The Brooks Locomotive Works of Dunkirk, N. Y., recently placed in service on the Lake Shore & Michigan Central Railroad one of their tandem compound locomotives. For sometime since their cross-compound, designed by John Player, has been at work on the same road, and has given the greatest satisfaction to all concerned.

The brass foundry of the Cox Brass Mfg. Company of Albany, N. Y., has been completely destroyed by fire. The loss is \$15,000 and the insurance \$10,000.

The Wm. G. Fischer Safe & Range Works of Kokomo, Ind., have made a voluntary assignment. The liabilities are estimated at \$56,000, while the assets, it is said, will reach only half that amount. The company will reorganize and the works will continue in operation.

The King Bridge Company of Cleveland, Ohio, have the contract for the iron work for the new rolling mill for the Brown-Bonnell Iron Company of Youngstown, Ohio. The mill will consist of two buildings 220 x 60 feet, connected by a building 50 x 60 feet.

It is stated that the Kentucky Union Railroad will erect extensive car shops at Lexington, Ky.

The Phoenix Safe & Lock Company, with a capital of \$10,000, have been incorporated by Francis M. Thomas, J. P. Matthews and others, at Birmingham, Ala.

The Joseph Bell Stove & Range Company, with a capital stock of \$100,000, have been incorporated at Muncie, Ind., for the purpose of selling and manufacturing stoves and ranges. The incorporators are Joseph Bell, D. Walter Bell, Edward E. Duferne, Ephraim Smell and J. Smith Talley. This new concern succeeds the old-established firm of the Jos. Bell Stove Company of Wheeling, W. Va., which concern will remove their plant from Wheeling to Muncie, Ind., at an early date. The new plant will be much larger than the old one at Wheeling, and the capacity for the manufacture of stoves and ranges will also be much larger.

The purchasers of the agricultural plant at Chattanooga, Tenn., have organized a new stock company to be known as the Chattanooga Industrial Company. F. F. Weihl is the president, and H. W. Grant secretary. The new company have not yet decided what they will do with the property, but it is probable that they will put it in operation.

The H. C. Frick Coke Company of Pittsburgh have just concluded the purchase of one-third interest in the Redstone Coke Works, near Uniontown, Pa., and 625 acres of coal land in North Union Township. The purchase was made from the estate of Presley H. Moore, deceased, and the consideration involved is \$530,000.

The Houston Car Company have been chartered at Houston, Texas, with a capital of \$400,000. D. D. Coley, N. L. Mills and associates are incorporators.

Among recently authorized corporations in Illinois are the following: American Aluminum Company, East St. Louis; capital stock, \$1,000,000; incorporators, J. C. Bates, Michael Busch and J. L. Mayer. Columbia, Electric Gas Company, Chicago; capital stock, \$500,000; incorporators, John H. Carruthers, William E. Briggs and John Irvine. Bear Electric Mfg. Company, Chicago; capital stock, \$500,000; incorporators, Samuel E. Moore, John H. Carruthers and John Irvine. The Bimetallic Wire Company, Chicago; capital stock, \$150,000; incorporators, William Taylor, Wells Goodhue and Henry D. Ames. Bradford Machine Company, East St. Louis; capital stock, \$100,000; Oscar Bradford, William G. Welch and Eugene S. Bradford.

The entire plant of the Fenton Metallic Mfg. Company of Jamestown, N. Y., has been destroyed by fire, together with a large quantity of finished goods, involving in all a loss of \$150,000.

Ludlow-Saylor Wire Company, St. Louis, Mo., are running their manufacturing department to its full capacity. They are receiving a great deal of work, and among the contracts recently secured by them mention the De Give

New Opera House, Atlanta, Ga., which is the largest opera house in the South. The contract calls for all the ornamental brass work, consisting of grilles, railings and trimmings for the proscenium boxes, &c. This is an unusually large contract, and the work will be of an order that is superior to that generally called for in work of a similar character.

The Excelsior Brass Works have filed articles of incorporation, and will carry on business at Dubuque, Iowa. The capital stock is \$50,000.

The Arbuckle Creek Coal and Coke Company has been granted a charter of incorporation to operate coke ovens on Arbuckle Creek in Fayette County, Pa.

Walter M. Stein of Philadelphia, is now building an additional battery of 18 retort coke ovens of his special design for the Glasgow Iron, Coal and Railway Company of Ferrona, Nova Scotia. It is stated that this company has had one battery of these ovens in successful operation for some time past.

The Schoen Mfg. Company, Allegheny, Pa., have about completed an order calling for 18,000 pressed steel ties for the New York Central Railroad. These ties each weigh 100 pounds, and are made by a process designed by Mr. Schoen of the above firm, as are also the fastenings for them. This concern have recently added to the equipment of their hydraulic plant, two new hydraulic presses and two new steam drop presses; the boiler capacity has also been increased by the addition of a new 160 horse-power boiler.

The Sherman Anti-Trust Law.

The members of the Mississippi Valley Lumbermen's Association were prosecuted in the federal courts recently under the Sherman Anti-trust law on an indictment charging them with having made an agreement and conspired together to advance the price of common pine lumber to \$11.50 per 1000, which was 50 cents more than the then prevailing price. Judge Nelson, sitting in the United States District Court at St. Paul, has sustained a demurrer to the indictment, holding that in order to show an offense under the statute it must be alleged that the accused conspired together to advance the price of some commodity, actually advanced it, and had a complete monopoly of the trade in the given article within the affected locality; that the advance must also be above a just and reasonable price, and that if the conspiring parties do not have a complete monopoly, the judge decides that the competition of other dealers will compel the advanced price of an article to go to its proper and reasonable price. Judge Nelson said, in giving judgment: "While it may be true that some of the dealers might attempt to induce purchasers to be governed by the price fixed in their locality by the parties to the agreement and try to keep up prices, yet competition in the commodity would soon bring the price down unless there were fraudulent or coercive means resorted to for the purpose of restraining other dealers, and preventing them from exercising their own judgment as to prices. An agreement between a number of dealers and manufacturers to raise prices, unless they practically controlled the entire commodity, cannot operate as a restraint upon trade, nor does it tend to injuriously affect the public. Unless the agreement involves the absorption of the entire traffic in lumber, and is entered into for the purpose of obtaining the entire control of it for extortionate objects, it is not objectionable to the statute, in my opinion. Competition is not stifled by such an agreement, and other dealers would soon force the parties to the agreement to sell at the market price, or a reasonable price at least."

R. T. Devries has resigned his position as superintendent of the Bessemer steel plant of the Bellaire Nail Works at Bellaire, Ohio. For the present, at least, a successor will not be appointed for Mr. Devries' position, but the duties in connection with it will be temporarily performed by John McCortney.

TRADE REPORT.

The more cheerful tone in the Iron and Steel trade has continued during the past week, and what anxiety there may have been for the balance of this year is dispelled, with a better outlook for the balance of the winter. The flurry in the Billet market in the Pittsburgh and Wheeling districts is pretty well over, leaving the market practically bare of supplies for November and December delivery. It is true that the great majority of buyers have covered, but there is at least some demand unfilled, which makes Soft Steel for early delivery very scarce, and has enabled sellers to demand and obtain \$24.50 and \$24.75. On deliveries for 1893 there is still a good deal of uncertainty, East and West, but the very low prices made some time since are not now being taken. It is quite evident that the consumption of Soft Steel has been universally underrated. It is urged, with a great deal of justice, that even at present relative prices for Spot Billets and Muck Bars, the advantage lies with the former.

Under the leadership of the Southern furnaces the market for ordinary Foundry and Forge Pig is firmer, with the chances considerably greater for an advance than for a decline. Some of the large companies have marked prices up an additional 25¢, but there is still Iron enough to go around at the price established by the first advance.

Makers of Bessemer Pig in the West have gathered encouragement from the rise in Billets, but as yet are unable to realize more remunerative figures themselves.

The Steel Rail trade is still very dull with very few inquiries coming up, and order books being cleaned up rapidly. The meeting of the makers next week is looked forward to with a good deal of interest.

The mills running on Structural Material and on Plates are very busy, although among the latter there is a small minority which has little gaps to fill, and is occasionally shading the price.

There is still some eagerness to capture work for future delivery among the Bar mills.

Sheets are in lively demand East and West, the only indication of weakness being the taking of orders for Steel Sheets by a few mills in the Chicago district.

There is quite a good demand for Merchant Steel, but the makers east of the Allegheny Mountains still complain of low prices made in their territory by Western works.

The Metal trade has little of encouragement to offer. Copper is being sold at fully a quarter of a cent under the 12¢ mark, which the companies claim to be holding at. Lead is weak for future delivery, although quite steady for spot metal. The low price of Spelter seems to have encouraged quite liberal buying without leading to a higher level. Tin Plates are easier for future delivery.

Philadelphia.

Office of *The Iron Age*, 220 South Fourth St., PHILADELPHIA, Pa., October 25, 1892.

The past week has been somewhat broken by the holidays, but a considerable amount of business has been done nevertheless, and on the whole at prices slightly in sellers' favor. One of the encouraging features in the situation is the urgency for quick deliveries, demonstrating, as it does, that stocks are light and consumption large. The tendency toward higher figures is not very strongly marked, but steadiness and firmness all through the list are plainly manifest, which is probably all that could be hoped for under present conditions. The volume of business appears to be increasing, so that taking everything into consideration, things are in good shape, with fairly good indications that still better times are likely to be met with in the near future.

Pig Iron.—With a steady shrinkage in stocks, and a continued good demand, holders are very firm, and show no disposition to accept business unless at full quoted rates. The leading companies have sold most of their product for the balance of the year, and with the present outlook for business, are rather inclined to move slowly in regard to quoting for deliveries during 1893. In some cases orders have been placed for deliveries including the first quarter of the coming year, but there is no particular pressure to either buy or sell. Some brands would be promptly taken in large lots at quoted rates, while for others bids at a trifle less would be just as quickly accepted—all depends on circumstances. But taking a broad view of the situation, it may be said that prices are firm, and with a very moderate increase in the demand, some brands would command more money, and even those that are in comparatively large supply would not yield very much in case of a temporary dullness. In other words, the response toward improvement would probably come quicker and easier than a movement in the opposite direction, even if there was some little falling off in the demand, which, from present appearances, is not likely to occur until toward the close of the year. Sales have been chiefly at prices about as follows for deliveries in Philadelphia or at equivalent points, and from 25¢ to 40¢ less for Virginia and Alabama Irons delivered in Maryland or South and Central Pennsylvania:

American Scotch, No. 1x.....	\$17.00 @	\$17.50
American Scotch, No. 2x.....	16 00 @	16.50
Standard Penna. (Lake Ore), No. 1x.....	15.00 @	15.50
Standard Penna. (Lake Ore), No. 2x.....	14.25 @	14.50
Standard Penna. (Lake Ore), No. 2 plain.....	13.50 @	13.75
Medium Quality, No. 1x.....	14.25 @	14.50
Medium Quality, No. 2x.....	13.50 @	14.00
Standard Virginia, No. 1x.....	14.75 @	15.00
Standard Virginia, No. 2x.....	14.00 @	14.50
Virginia and Southern, No. 1x.....	14.25 @	14.50
Virginia and Southern, No. 2x.....	13.50 @	13.75
Standard Penna. and Virginia Forge.....	13.25 @	13.50
Ordinary Forge.....	12.75 @	13.00

Bessemer and Low Phosphorus Iron.—Business seems to drag a little in this line, but deliveries on old contracts are being taken somewhat freely, so that makers are hopeful of being able to make new contracts before long. Meanwhile \$16 @ \$16.25 and \$17.50 @ \$17.75 at furnace appear to be the usual asking prices, with sales at \$18 for small lots of strictly gilt-edged quality of low Phosphorus Iron.

Steel Billets.—The same general features prevail as during the past several weeks, viz., scarcity for nearby deliveries, and uncertainty in regard to quotations for such as extend over three or four months. Fair average prices would probably be \$26 @ \$26.25 for the first half of November, \$25.75 @ \$26 for the last half, \$25.50 for December, and for still later dates proba-

bly \$25 @ \$25.25 would be pretty close figures. The feeling is unsettled, however, and it would excite very little remark to see either an advance or a decline of about 50¢ a ton, as prices are ready to move either way according to the side from which there is the greatest pressure to do business. The market for the present, however, seems to be entirely in the hands of sellers, so that there is not much prospect for lower prices, as consumers are bare of stock, and mills crowded with orders.

Steel Rails.—Market dull and unchanged. Mills are busy in all their specialties—Rails excepted—which are taken in small lots only at \$30, f.o.b. cars at mills.

Bar Iron.—The demand is moderately active, but there are so many mills competing for business that it is almost impossible to maintain reasonably good prices. City deliveries of best makes are quoted at \$1.70 @ \$1.75, while at intermediate points about a tenth less seems to be the usual asking prices, with occasional transactions at a little below these figures. Several inquiries for good sized lots have been on the market during the past few days, for car and locomotive building, and are probably closed at something pretty close to the figures above named.

Skelp.—Business could be had in liberal amounts at something less than 1.60¢, delivered, but as there is a considerable amount of work on hand, manufacturers are not disposed to accept orders at prices and terms offered. Sales to-day of about 1000 tons at 1.60¢ with bids for additional quantities at similar prices.

Plates.—There is a great deal of work in hand, and it is believed there is a great deal more likely to come on the market before the close of the year, but prices are not particularly strong. Some mills quote very firmly; others less favorably situated are inclined to "wobble," so that buyers can sometimes work their orders in at prices a little below the general market, but a good deal depends on what a buyer may happen to want, and how the mill may be fixed for that particular kind of work. As a rule, however, the market may be considered as steady at unchanged prices; there are certainly no marked indications of weakness, and with just a little more demand it is not improbable that some leading concerns would be inclined to ask more money. For the present, however, small lots delivered may be quoted about as follows.

	Iron.	Steel.
Tank Plates.....	1.85 @ 1.90¢	1.90 @ 2.00¢
Shell.....	2.20 @ 2.30¢	2.20 @ 2.30¢
Flange.....	2.70 @ 2.80¢	2.50 @ 2.60¢
Fire Box.....	3.00 @ 4.00¢	2.70 @ 2.80¢
Special qualities.....		3.25 @ 3.75¢

Structural Material.—There is nothing specially new on the market to-day, but mills have so much work on their hands that they are hardly in a position to accept more. Prices have not improved, however, and in several recent transactions extremely low figures are said to have been accepted. The general situation denotes great activity during the winter months, and while prices may not show much change there is sure to be plenty of business. General quotations are about as follows: Angles or Sheared Plates, 1.95¢ @ 2¢, delivered; Universals, 2¢ @ 2.10¢, and Beams, Channels or Tees, 2.20¢ @ 2.30¢.

Sheets.—A very active business is reported in this department, and for some specialties mills are a long way behind their orders. Stocks are lower than they have been for many years, and from present appearances there will be more or less difficulty in the matter of deliveries for some weeks to come. Prices are firmer, and Thin Sheets may soon be quoted at

an advance, but in the meanwhile business can be done at prices about as follows:

Best Refined, Nos. 14 to 20.....2.75¢ @ 2.85¢
 Best Refined, Nos. 21 to 24.....2.90¢ @ 3.00¢
 Best Refined, Nos. 25 to 26.....3.15¢ @ 3.20¢
 Best Refined, No. 27.....3.30¢ @ 3.40¢
 Best Refined, No. 28.....3.40¢ @ 3.50¢
 Common, 1/4¢ less than the above.

Quotations given as follows are for the best Open-Hearth Steel, ordinary Bessemer being about 1/4¢ lower than are here named:

Best Soft Steel, Nos. 14 to 203¢ @ 3 1/4¢
 Best Soft Steel, Nos. 21 to 24.....3 1/4¢ @ 3 1/2¢
 Best Soft Steel, Nos. 25 to 26.....3 1/2¢ @ 3 3/4¢
 Best Soft Steel, Nos. 27 to 28.....3 3/4¢ @ 4¢
 Best Bloom Sheets, 1/4¢ extra over the above prices.
 Best Bloom, Galvanized, discount.... @ 70 %
 Common, discount... @ 72 1/2 %

Old Material.—The demand is about fair, but there is no change in prices, and sales are ordinarily at figures about as follows: Old Iron Rails, \$19 @ \$20, delivered; Old Street Rails, \$20 @ \$21; Old Steel Rails, \$16 @ \$17; No. 1 Railroad Scrap, \$17 @ \$17.50, Philadelphia, or for deliveries at mills in the interior, \$17 @ \$18, according to distance and quality; \$11 @ \$12 for No. 2 Light; \$12 @ \$13.50 for best Machinery Scrap; \$12 @ \$13 for Wrought Turnings; \$8.50 for Cast Borings, and nominally \$20 @ \$22 for Old Fish Plates, and \$14.50 @ \$15 for Old Car Wheels.

Wrought-Iron Pipe.—Market continues in the same state as noted last week. General demand is fair, and with the exception of one or two considerable inquiries from the West, there does not seem to be any immediate prospect of material increase in demand. Base prices for Wrought-Iron Pipe are as follows: Butt, Black, 57 1/2 %; Butt, Galvanized, 50 %; Lap, Black, 67 1/2 %; Lap, Galvanized, 57 1/2 %, with the usual dealers' and jobbers' commission. Boiler Tubes, 3 inches and larger, 67 1/2 %.

The co-partnership of Justice Cox, Jr., and Chas. K. Barns, under the firm name of Justice Cox, Jr., & Co., has been dissolved. Mr. Cox will continue in the same line of business on his own account, under the firm name of Justice Cox, Jr., at 218 South Fourth street, and Mr. Barns at 224 South Fourth street, under the firm name of Chas. K. Barns & Co. Both these gentlemen have a wide and intimate acquaintance with and in the trade, and will individually doubtless maintain the character and energy which distinguished the old firm and made the name familiar to the trade in all parts of the country.

Chicago.

(By Telegraph.)

Office of *The Iron Age*, 59 Dearborn street, CHICAGO, October 26, 1892.

The Columbian celebration interfered with business in some lines during the past week. Offices were pretty generally closed on Thursday and Friday, while the work of preparation in decorating and the entertainment of visitors consumed additional time. The Hardware trade, however, was helped by the presence of visitors from a wide section of the country, who in many cases took occasion to make purchases, which increased the ordinary volume of trade and to that extent was beneficial. The railroads are again in the midst of a car famine which is probably more serious than any previous one. They are enforcing demurrage very strictly in the hope of being able to keep their cars in constant use, and thus help to diminish the inconvenience. A slight increase in car orders has been caused by this movement, but they are being placed quietly with the works in shape to make prompt deliveries. The Car building trade, how-

ever, is not as active as had been expected by this time. The very mild weather of the early part of October has at last given way to more seasonable weather, which will help branches of business that have been languishing for some little time on this account.

Pig Iron.—Everything is cheerful this week. The contrast is most marked between the conditions now obtaining and those of a few weeks back. Then nearly every rumor was in the direction of lower prices, or unsatisfactory business in some way. Now, reports are all in the line of advancing prices or sellers withdrawing from the market because they have taken orders as far ahead as they deem prudent, or very largely increased shipments, indicating a rapid reduction in stocks. Although last week was badly broken by the celebration, yet an active business was experienced by nearly every Pig-Iron house. The sales made aggregated a larger quantity than in any week for some time, and inquiries indicate that a still heavier trade will be precipitated on the market in the near future. Not only small lots are now being taken, but large consumers are again coming in, negotiating for a supply covering a considerable portion of next year. They realize that the market has turned, and are anxious to cover their future requirements as well as possible at present prices. The Southern furnace companies are leading in the matter of advancing prices, and we are obliged to revise our quotations accordingly. The Tennessee Company have within the week named \$9, Birmingham, as their minimum for Gray Forge. This is 75¢ above the lowest point at which this grade of Iron was sold during the depression. The advance thus far made is as yet not large enough to warrant the idle furnaces to start up, which is perhaps a good thing. The market will have a chance to work into still better condition before the supply increases too rapidly. Sales of Lake Superior Charcoal have been made to some extent, but the demand is not proportionately as heavy as for Coke Iron. Quotations are as follows, cash, f.o.b. Chicago:

Lake Superior Charcoal.....	\$16.50 @ \$17.00
Local Coke Foundry, No. 1.....	13.75 @ 14.25
Local Coke Foundry, No. 2.....	13.50 @ 14.00
Local Coke Foundry, No. 3.....	13.25 @ 13.75
Local Scotch.....	14.25 @ 14.75
Ohio Strong Softeners.....	16.25 @ 17.00
Southern Coke, No. 1.....	14.75 @ 15.25
Southern Coke, No. 2.....	13.85 @ 14.25
Southern Coke, No. 3.....	13.35 @ 13.60
Southern, No. 1, Soft.....	13.85 @ 14.25
Southern, No. 2, Soft.....	13.35 @ 13.60
Southern Gray Forge.....	12.85 @ 13.10
Southern Mottled.....	12.50 @ 12.75
Tennessee Charcoal, No. 1.....	17.50 @ 18.00
Alabama Car Wheel.....	19.50 @ 20.50
Coke Bessemer.....	15.50 @ 16.00
Hocking Valley, No. 1.....	17.00 @ 17.50
Jackson County Silvery.....	17.00 @ 17.50

Bars.—The trade in Bars was decidedly influenced by the holidays, and very little new business is reported. Prices are maintained, however, on the basis of 1.65¢ @ 1.70¢, Chicago, half extras. Jobbers state that the demand from manufacturing consumers has not abated, showing that the mills are still backward in deliveries. They continue to quote 1.85¢ @ 1.95¢ for small lots from stock. Soft Steel Bars are steady at 1.75¢ @ 1.80¢, Chicago, from mill and 1.90¢ @ 2¢ from stock.

Structural Iron.—All the manufacturers are now pressed for deliveries; they are more crowded with work than ever. Desirable orders for Beams are quoted at 2.35¢ @ 2.50¢ and upward, according to the location of the mill. Beams requiring no fitting could, perhaps, be had at lower figures. There appears to be less anxiety on the part of mills to seek new business than at any time this year. They claim that their first effort is to catch up with the contracts now on their books and for which they are being harassed by their customers. Angles continue to be quoted at 2¢ @ 2 1/4¢ for mill shipments; Universal

Plates, 2¢ @ 2.20¢; Sheared Plates, 2¢ @ 2.10¢; Tees, 2.40¢ @ 2.50¢, and very scarce.

Plates.—The dealers report a moderate business, with fewer contracts now in sight. The manufacturers of Plates are making much better deliveries than some time since, and the trade feels the effect of the easing up. Prices on mill shipments are reported to be about as follows: Tank Steel, 2¢ @ 2.10¢; Shell Steel, 2.15¢ @ 2.25¢; Flange Steel, 2.30¢ @ 2.40¢. Quotations from stock are as follows: Tank Steel, 2.30¢ @ 2.50¢; Shell Steel, 2.60¢ @ 2.75¢; Flange Steel, 2.75¢ @ 3¢; Iron Sheets, Nos. 10 to 14 gauge, 2.45¢ @ 2.60¢; Steel Sheets, Nos. 10 to 14 gauge, 2.50¢ @ 2.75¢. Boiler Tubes are firm at 67 1/2 % discount.

Sheets.—Some of the Black Sheet mills are now in a position to take contracts for delivery in November and December, and are quoting a little lower prices on Iron Sheets. No. 27 can be had at 2.95¢ @ 3¢, Chicago, for mill shipment. Steel Sheets, on the contrary, are being marked up to correspond with the recent advance in Billets, and No. 27 are now being quoted at 3.25¢, Chicago. Galvanized Iron is unchanged at 70 % @ 70 and 5 % discount for Juniata, mill shipments, with the demand unabated.

Merchant Steel.—While the season is over for the largest trade, there is a continued flow of orders from general consumers. Specifications are being received very freely on season contracts, thus keeping the mills well employed. A branch of trade that has of late been coming into prominence is the manufacture of Steel Windmills. One concern in Chicago in this line is now ranked as the third largest consumer of Steel in the city. We continue to quote Open-Hearth Machinery and Spring Steel at 2¢ @ 2.20¢, Chicago, for carload lots; Tire Steel, 1.90¢ @ 2¢, and Tool Steel, 6 1/4¢ and upward, according to quality.

Billets and Rods.—Some 3000 tons of Billets have been sold in this market since our last report at advancing prices. The quotation now made is \$26, Joliet. Wire rods are also dearer, but the local manufacturers can only supply very small quantities, for which they ask \$35.

Rails and Track Supplies.—Very little was done in Steel Rails during the past week. Prices remain unchanged at \$31 @ \$32.50, according to quantity. Splice Bars, either Iron or Steel, are quoted 1.70¢ @ 1.75¢. Track Bolts are in reasonably fair demand and a little firmer. Hexagon Nuts are quoted at 2.65¢ @ 2.75¢, for mill shipments. Spikes are steady at 2.05¢ for mill shipments and 2.10¢ @ 2.15¢ from stock.

Old Rails.—A few hundred tons of Old Iron Rails have changed hands at \$18.25. The dealers are still accumulating stock and appear to control the local trade more than ever. Old Steel Rails are unchanged at \$12.50 @ \$14.25, according to length. Old Car Wheels have been quiet so far as actual transactions are concerned. Some of the railroads claim that they are offered \$14.50 @ \$15, and even higher for their stock, but dealers insist that \$14 is as high as they would care to bid.

Scrap.—Transactions in Old Material were decidedly curtailed by the holidays, but prices are firmly maintained. Quotations unchanged, as follows: No. 1 Railroad, \$16 @ \$16.50; No. 1 Forge, \$15 @ \$15.50; No. 1 Mill, \$11; Pipes and Tubes, \$10; Horseshoes, \$16 @ \$16.50; Sheet Iron, &c., \$6; Cast Borings, \$5.75; Wrought Turnings, \$8; Axle Turnings, \$9.50 @ \$10; Machinery Cast, \$11.50 @ \$12; Stove Plate, \$9; Malleable Cast, \$10; Car Axles, \$18.50 @ \$19; Fish Plates, \$17.25; Mixed Steel, gross ton, \$10.50 @

\$11; Coll Steel, \$15; Leaf, \$16.50, and Tires, \$15.

Metals.—Lake Copper is very strong, but unchanged at 12½¢ for carloads and 12¼¢ for small lots. Casting brands are held at 11¢ for carloads, and refiners are not pushing trade at that. Consumers have stocked up pretty well, but there is still some inquiry. Certain brands of Spelter can be bought at 4.25¢ for carloads, and a few sales are reported at that price. Pig Lead has been steady at 3.77½¢ @ 3.80¢ for carloads, with sales reported of about 600 tons, spot and future delivery.

St. Louis.

Office of *The Iron Age*,
Bank of Commerce Building,
St. Louis, October 24, 1892.

Pig Iron.—The demand during the past week has been very satisfactory. Prices are holding up remarkably well, and indications point to a steady trade at to-day's prices. Furnaces are not pushing the sale of their product to any great extent, seeming disposed to reserve a portion of their output so as to take advantage of any future advance in prices. Local consumers of Pig Iron are all running full, and the outlook for the balance of the year is very encouraging. Prices are about 50¢ per ton higher to-day than those recorded 30 days since, and this advance is pretty generally adhered to. Gray Forge is firm at \$8.50, f.o.b. cars at furnace, and a number of good-sized lots have been sold at this figure. Stocks on furnace banks are being steadily reduced, and if the present demand continues a gradual advance in prices will doubtless prevail. For ordinary sized quantities the prices quoted below are bottom, which are for cash, f.o.b., St. Louis:

Southern Coke, No. 1 Foundry.....	\$14.00 @	\$14.25
Southern Coke, No. 2 Foundry.....	13.00 @	13.25
Southern Coke, No. 3 Foundry.....	12.25 @	12.50
Gray Forge.....	12.00 @	12.25
Southern Charcoal, No. 1 Foundry.....	15.00 @	15.25
Southern Charcoal, No. 2 Foundry.....	14.50 @	14.75
Missouri Charcoal, No. 1 Foundry.....	14.25 @	14.50
Missouri Charcoal, No. 2 Foundry.....	13.75 @	14.25
Ohio Softeners.....	16.25 @	16.75

Bar Iron.—Manufacturers of Bar Iron continue to report a steady demand at unchanged prices. While there is no large buying, mills are in receipt of any number of moderate sized orders, which in the aggregate go to make up a large tonnage. Prices are occasionally shaded, but the purchase has to be exceptionally large to secure better than quoted below. Lots from mill command 1.65¢, half extras, f.o.b. East St. Louis. Jobbers ask 1.80¢ @ 1.85¢, according to quantity.

Barb Wire.—The demand for Barb Wire does not improve any, and prices are quoted as heretofore. The season is now over and a revival of trade is not looked for until after the new year, unless an unlooked for cut in freight rates would make it advisable for the locality favored to order earlier. Mills quote \$2.20 for Painted and \$2.65 for Galvanized.

Wire Nails.—During the week under review the demand has slightly improved, without, however, having any effect on prices, which remain as last quoted. Local mills ask \$1.65 @ \$1.70, f.o.b. St. Louis for carload quantities.

(By Telegraph.)

Pig Lead.—Sales during the past week have been for limited quantities from car lots to one sale of 100 tons, at 3.75¢ for November and December delivery. The

market seems firm at this figure, and while it is impossible to sell at better than 3.75¢, on the other hand Lead is not obtainable at less than 3.70¢ by brokers even in large quantities.

Spelter.—There is no change to note in this metal. Sales are made for delivery during the next six months at 4.15¢; for October delivery 4.20¢ is quoted, and will doubtless have to be paid, as October Spelter seems to be in the hands of a few who are in a position to dictate prices. Stocks are large, and prices will doubtless go lower and remain so until after the turn of the year.

The St. Louis Railing Works, St. Louis, made an assignment to-day for the benefit of their creditors to Henry E. Mills, attorney. It is expected that all claims will be paid in full, and the business continued as heretofore.

Pittsburgh.

Office of *The Iron Age*, Hamilton Building,
Pittsburgh, October 25, 1892.

At no time for months past has there been such a hopeful feeling regarding the outlook in the Iron and Steel trades as exists at the present time. Evidence is also at hand to show that in some lines there has already been a decided improvement both in demand and prices. This applies to Structural Shapes, Steel Plates, Merchant Bars, Pipes and Tubes, Merchant Steel, and to Soft Steel particularly. As a rule, all the finishing mills are well fixed with orders, and in some cases we find mills that have their entire product sold for the balance of this year and a goodly number of orders booked for delivery next year. Of course in many lines prices are low. Taken as a whole, the situation is encouraging, and the outlook for this year and the early part of next year is very bright. Another very pleasing feature of the situation is the fact that for the first time since July 1, Pittsburgh can be said to be free from labor troubles. It is admitted on all sides that the struggle at Homestead has terminated, with victory on the side of the firm, while at the Elba Iron Works of the Oil Well Supply Company, the non-union men are doing good work, and the output is very nearly as large as when the plant was under control of the Amalgamated Association. Much credit is due Manager T. B. Everson for the excellent showing he has made at this plant in the face of some very trying conditions.

Pig Iron.—There has been little or no change in the condition of the market during the week under review, with the exception that Bessemer Pig makers are showing a disposition to refuse to book orders very heavily for delivery next year at present ruling prices. As a reason for this the claim is made that if the heavy demand for Billets now going keeps up, and the recent advance in prices is sustained, it cannot help but have a favorable effect on Bessemer Pig. During the past week a dealer in this city with a large block of Bessemer Iron to place was unable to have his order booked, although a price was offered to a number of furnaces that undoubtedly would have been favorably considered two weeks ago. There is no question but that a much better feeling prevails among makers of Bessemer Pig, and the opinion is pretty general that better prices in the near future are not improbable. A very good demand for Gray Forge is going and the established price of \$12.50, Pittsburgh, seems to be well maintained. During the past week reports of sales at \$12.40, Pitts-

burgh, were in circulation, but were very strongly denied by those reported as having made sales at that figure. In Foundry Iron the demand is fairly active, and prices for standard brands are well maintained. Occasionally sales of Foundry Iron a little off grade are made at figures slightly lower than are given below. Again it is reported that some of the idle stacks in the Mahoning and Shenango Valleys will be put in operation before the first of the year. We quote the market as follows f.o.b. cars Pittsburgh.

Neutral Gray Forge.....	\$12.50 @	cash.
All-Ore Mill.....	12.50 @	12.75
No. 1 Foundry.....	14.00 @	14.25
No. 2 Foundry.....	13.00 @	13.25
Charcoal Foundry No. 1.....	19.50 @	20.00
Charcoal Foundry No. 2.....	19.00 @	19.50
Bessemer Iron.....	13.70 @	13.85

Bessemer Billets.—Now that the flurried conditions surrounding the Billet market for the past ten days have calmed down to some extent a statement as to the causes which brought about the recent unexpected advance in prices, and the scarcity of Steel for this year's delivery, may be of interest. First and foremost it is evident to everybody that there has been an enormous increase in consumption, without a corresponding increase in production. Many concerns that heretofore were spasmodic buyers of Soft Steel are now regular purchasers and large ones at that. This applies particularly to Pipe and Tube mills, many of whom are buying large quantities of Billets. Within the past year the Wire Nail makers have largely increased their capacity for production, which has correspondingly increased their consumption of Billets. Since July 1 the Carnegie Steel Company, Limited, have not rolled a pound of Iron in any of their establishments, but have substituted Steel altogether, while many other concerns are using Steel instead of Iron when it is possible to do so. This enormous increase in consumption has brought a shortage in supply which bids fair to continue all of this year, and possibly during the early months of next year. The sudden advance in prices is accounted for by the fact that many large buyers were holding off placing their orders in expectation of lower prices, and reports of some low sales by Pittsburgh and Wheeling brought them into the market at a time when makers were in position to shove up prices before accepting their business. Transactions during the week were few, and no large blocks are reported as changing hands. Billets for October delivery can hardly be had at any price, while for November and December \$24 is asked and in a few cases has been obtained, depending altogether on how urgently the buyer was in need of Steel. Several dealers have asked \$25 for Steel for delivery during the last two months of the year, but no sales at that figure are reported. For January, February and March delivery, a sale is reported to have been made by one Pittsburgh mill for Cleveland delivery at a price said to be equal to \$23 at makers' mill. One concern advise us that they declined an order for delivery during the first three months of next year, although the buyer offered very close to \$23 at maker's mill.

Structural Material.—One of the largest makers of Structural Shapes in this vicinity advises us that the heavy demand noted for some time past is keeping up, and, in fact, is increasing. This is undoubtedly due to the fact that buyers are pushing in their orders as fast as possible in order to have as many filled as they can before winter weather sets in, thus stopping building operations. For this reason the tonnage offering is particularly heavy, and no trouble whatever is experienced in maintaining the recent advance in prices. A disposition is being manifested to not book any more orders for future delivery

until orders now on hand are cleaned up. With the output at Homestead being increased right along, the supply of Beams and Channels, particularly, will of course be considerably larger now than it has been for three or four months past. We quote prices as follows: Beams and Channels, 2.10¢ @ 2.20¢, according to size of order and condition of delivery; Universal Mill Plates, Steel, 1.75¢ @ 1.85¢; Angles, 1.80¢ @ 1.90¢; Tees, 2.40¢ @ 2.50¢; Z Bars, 2¢ @ 2.10¢.

Muck Bars.—We continue to report an active demand, and some little difficulty is still experienced in getting prompt shipments. The phenomenal advance in the price of Soft Billets has already had its effect on Muck Bars, and if the advance is sustained, which it promises to be for some time at least, many concerns heretofore using Steel will go back to the use of Muck Bars, which will consequently result in an increased demand. We continue to quote No. 1 Muck Bars at \$24.50 and \$25, with the ruling price at \$24.75. We note a sale of 600 tons of No. 1 Bars at \$24.75, f.o.b. cars Pittsburgh.

Ferromanganese.—There is no change to note, and prices recently quoted, being \$62 @ \$62.50, are firmly maintained.

Steel Rails.—The remarks made under this head for the past month or so still fitly describe the condition of the Steel Rail business. The demand is very small and does not show any signs of improvement in the near future. The established price of \$30, f.o.b. at mill, for standard sections is maintained.

Steel Plates.—In sympathy with Structural Material we report a very active demand for Steel Plates and some very good orders have been booked within the last 30 days. With the production at Homestead rapidly assuming its former proportions a very visible increase in supply is thus afforded. Much of the business now being offered is for prompt delivery, and as some of the mills have their product practically sold up for the balance of the year, they are of course unable to participate in these orders. Prices are firmly maintained, and we quote the market as follows: Flange, 2.10¢ @ 2.35¢, according to time of delivery; Fire-Box, 3.50¢ @ 3.75¢; Tank, 1.75¢ @ 2¢; Shell, 2¢ @ 2.25¢; Bridge Plates, 2.10¢ @ 2.25¢.

Skelp Iron.—The same condition of affairs noted last week represents the situation this week. Mills making Skelp Iron all report a very active demand, and as stated last week, several concerns have sufficient business on their books to take their output for several months to come. The improvement in the demand for Pipes and Tubes has caused the very active demand for Skelp Iron noted in these columns for some time past. Should the advance in Bessemer Billets be maintained the demand for Skelp Iron will probably be enlarged, as a number of concerns now using Soft Steel for Pipe and Tubes will be compelled to go back to the use of Skelp Iron wherever practicable. Prices do not show any change, and we repeat our quotations of last week, as follows: Grooved Skelp Iron, 1.60¢ @ 1.65¢, and Sheared, 1.80¢ @ 1.85¢, 4 months, or 2 % off for cash. We note a sale of 500 tons of Grooved at 1.62½¢ and 700 tons of Sheared at 1.80¢ on the above terms.

Wire Rods.—There is nothing new to report in this market this week. Very few new orders are being placed, but the two mills in this section who make Wire Rods for the open market are understood to have sufficient orders to keep them in operation for some time. Prices do not show much change, and we quote the market at \$31 @ \$31.50, with the first named as the ruling price for fair-sized lots.

Merchant Steel.—A very heavy demand is reported and makers generally

have considerable difficulty in turning out material as fast as wanted. Some concerns are so favorably situated as to orders that they have been compelled to decline business where prompt shipment was a condition of the order. For round lots we quote base prices as follows: Toe Calk, 2.25¢; Spring, 2.10¢; Machinery, 2¢; Plow Steel Slabs with sheared edges, 1½-inch thick and heavier, 2¢; Tool Steel we quote from 6¢ upward, according to quality.

Merchant Bars.—The demand continues active and mills everywhere are running to their full capacity and shipping their product about as fast as it is turned out. There continues to be quite a difference in prices ruling for prompt shipment over those for material for late this year or early next year delivery. No. 1 Bars for early shipment we quote at 1.65¢ @ 1.70¢, while for late delivery these prices would probably be shaded to some extent. Old Rail and Scrap Bars for early shipment we quote at 1.55¢ @ 1.60¢, while for late delivery 1.50¢ @ 1.55¢ would be accepted. The demand for Sheets is exceptionally heavy and ruling prices are firmly maintained, with prospects of further advances in the near future. We quote No. 24 Sheets at 2.80¢, No. 26 at 2.90¢ and No. 27 at 3¢, all 60 days, or 2 % off for cash.

Wire and Cut Nails.—The demand for Wire Nails continues very heavy, especially for prompt shipment, and as a result prices are stiffening up to some extent. Should the advance in Billets be sustained, an advance in prices of Wire Nails will undoubtedly follow, as makers claim they cannot be sold at present prices without a loss when the present high price of Billets is taken into account. We quote Wire Nails at \$1.50 in carload lots and \$1.55 and \$1.60 in less quantities. In sympathy with Wire Nails, there is a heavy demand for Cut Nails, and mills in the Wheeling district are understood to be sold up for some time to come. We quote Cut Nails at \$1.50 in carload lots for 30¢ averages, f.o.b. in Wheeling district. For large lots this price would probably be shaded slightly. We are advised that some makers of both Wire and Cut Nails are declining to quote prices for Nails for delivery for next year owing to the uncertain conditions surrounding the Bessemer Steel market.

Barb Wire.—As noted in our report of last week the low prices quoted by some makers of Barb Wire have resulted in some large orders being placed. As a result of this some makers have withdrawn recent quotations and prices are stiffening up to some extent. For round lots we quote Painted Barb Wire at \$2.10 and Galvanized at \$2.50. For carload lots and less a slight advance on these prices is obtained.

Wrought-Iron Pipe.—One of the largest makers of Pipe and Tubes in this country advises us that the general conditions governing the Pipe business are more favorable at the present time than they have been for some months past. As we have already stated discounts have been reduced twice since July 1 last, the last reduction having been made about two weeks since, and amounted to 2½ %. The official list of discounts of the association is now as follows: Black, Butt Weld, 57½ and 10 %; Lap 67½ %; Galvanized, Butt Weld, 50 and 10 %; Lap, 60 %; Boiler Tubes up to 2½ inches, inclusive, 57½ %; 3 inches and larger, 65 %; Casing, 55 %; Inserted Joint Casing 50 %.

Old Rails.—During the past two or three weeks trade has fallen off to some extent and the fear is expressed that Old Iron and Steel Rails are rapidly getting back into the deplorable condition in which they were up until within a month or so. Prices have weakened considera-

bly, and we quote as follows: Steel Rails, short lengths, \$15.25 @ \$15.50; mixed lengths, \$15, and long lengths, \$15.50. In Mahoning Valley, long length Steel Rails may be quoted at \$16, and iron rails at \$19.50 @ \$20.

Iron and Steel Scrap.—A slight improvement in demand is reported and prices are looking up a little. A change for the better in the Iron and Steel Scrap trades would be welcome to those engaged in this line of trade, who state that this year has been the worst in the history of the business. We quote as follows: No. 1 Railroad Wrought Scrap, \$14.50 @ \$14.75 ¢ net ton; Cast Scrap, \$11.50 @ \$12 ¢ gross ton; Billet and Bloom Ends, \$16 ¢ ton; Cast-Iron Borings, \$6.50 @ \$7 ¢ gross ton; Railroad Coil Springs, \$17.50 @ \$18 ¢ gross ton; Leaf Springs, \$19.50 @ \$20; Old Steel Axles, \$19.50 ¢ gross ton.

For some time past the Bellaire Nail Works of Bellaire, Ohio, have had under consideration the question of erecting an additional blast furnace at their plant. For some time this concern have been large buyers of standard Bessemer Pig-Iron for use in their Bessemer department, and the probabilities are that the output of two furnaces could be used by the firm in the manufacture of Bessemer Blooms, Billets and Slabs. As yet, however, their Board of Directors have taken no action in this matter.

Cincinnati.

(By Telegraph.)

Office of The Iron Age, Fourth and Main Sts.,
CINCINNATI, October 26, 1892.

There is a stronger and more confident tone to the Pig Iron market than has prevailed for a long time, and a further advance of 25¢ ¢ ton is fully established on Foundry and Gray Forge Iron for spot and for delivery for six months to come. The sales have not been very large, but aggregate is about 15,000 tons for the week, 4000 tons being the largest sale. Gray Forge selling at \$8.75. No. 2 Foundry \$9.75, and No. 1 Foundry \$10.75, f.o.b. Birmingham, and some Tennessee Iron on that basis, which net the furnace considerably more. The furnaces are now contending for a further advance of 25¢ ¢ ton and are indifferent about selling at the old rates, but buyers are for the present refusing to pay the advance asked, although the present aspect of the market favors the supposition that it may be established in the early future. There is no marked improvement in the demand or value of other kinds of Iron, but there is a steady demand for Charcoal Iron in a small way at previous prices. There is a liberal inquiry for Gray Forge and Foundry Iron for delivery far into next year, or for the whole year, but the furnaces will not entertain offers at any prices which buyers would pay. No. 3 Foundry is quiet, and while it is firmly held at previous prices, any large demand would doubtless cause an advance. Mottled Iron is in light supply and could doubtless be sold at the relative advance obtained for other kinds of Iron.

Quotations are as follows:

Foundry.		
Southern Coke, No. 1.....	\$13.50 @	\$13.75
Southern Coke, No. 2.....	12.50 @	12.75
Southern Coke, No. 3.....	11.75 @	12.00
Ohio Soft Stone Coal, No. 1.....	16.00 @	16.50
Ohio Soft Stone Coal, No. 2.....	15.00 @	15.50
Mahoning and Shenango Valley.....	16.00 @	17.25
Hanging Rock Charcoal, No. 1.....	19.75 @	20.00
Hanging Rock Charcoal, No. 2.....	19.00 @	19.50
Tennessee and Alabama Charcoal, No. 1.....	16.50 @	17.00
Tennessee and Alabama Charcoal, No. 2.....	15.50 @	16.00
Forge.		
Gray Forge.....	11.50 @	11.75
Mottled Neutral Coke.....	11.25 @	11.50

Car Wheel and Malleable Irons.		
Standard Southern Car Wheel.....	13.75 @	19.00
Lake Superior Car Wheel and Malleable.....	17.75 @	18.00

Louisville.

LOUISVILLE, KY., October 24, 1892.

All signs point to the market holding steady at present prices, with a tendency toward an advance. Buyers are willing to purchase freely, and where consumers that have not been in the market for some time are made quotations that are higher than what they bought at in the past, and declined to close, thinking prices too high, it takes but a short time for them to find out that the situation is a firm one and that it is wise for them to buy at the present time. There have been offers for large amounts of Iron by commission houses who desire to sell again, showing that close observers feel that the present moment is an opportune one for buying. When it is considered that stocks in England four years ago were in the neighborhood of 3,000,000 tons, and that the reduction for the first six months of this year was equal to the stocks now remaining, some 784,000 tons, the indications are that both in England and this country prices will increase. It, however, is not considered desirable on the part of furnacemen for a rapid advance, and their aim is to hold prices down rather than to aid in any movement to increase them rapidly. There is a growing scarcity of Mill grades for prompt shipment, and one of the largest companies has none to offer this year, can only sell for delivery in 1893. Charcoal Irons are also in demand and prices have improved. We quote for cash, f.o.b. cars Louisville:

Southern Coke, No. 1 Foundry....	\$13.50 @	\$14.00
Southern Coke, No. 2 Foundry....	12.25 @	12.50
Southern Coke, No. 3 Foundry....	11.50 @	12.00
Southern Coke, Gray Forge.....	11.25 @	11.75
Southern Charcoal, No. 1 Foundry.	15.00 @	16.00
Southern Car Wheel.....	18.00 @	19.00

Cleveland.

CLEVELAND, OHIO, October 24, 1892.

Iron Ore.—The reported Ore sales during the past week, while small, have been fully up to the average of the past several weeks. It may perhaps have reached a figure a trifle higher than the late average, but there is nothing in it at all worthy of special mention. Sales are at no better prices than late figures, though on account of the slow and steady rise in lake freights during this and previous weeks Ore men should be asking more money. The rate for Ore transportation from Ashland and Two Harbors to Ohio ports has been advanced to \$1.30 per ton, and from Marquette to \$1.10—a lift in each case of 5 cents over the quotations of last week. This is due to the increased demand for tonnage to take grain from the head of Lake Superior at higher rates. There has been no change in the Escanaba rate, 75¢ being the ruling figure. At these advanced rates some shipments of Ore which were likely to have come from Marquette are now likely to come from Escanaba, and the entire shipments which would have come from Lake Superior will probably be somewhat smaller for the remainder of the season than otherwise would have been the case. The receipts for the past week have been more than those of the corresponding week of last year, or 52,746 tons last week to 25,411 tons for the corresponding week in 1892. Notwithstanding a holiday, shipments to furnaces compare pretty favorably. For the week ending October 21, 1891, the shipments were 39,620 tons, while last week the shipments were 29,075 tons, or 8 tons less than the week previous. Following are present quotations:

No. 1 Specular and Magnetic Ores, Bessemer.....	\$5.00 @	\$5.50
No. 1 Specular and Magnetic Ores, Non-Bessemer.....	4.00 @	4.50

Hematite Ores, Bessemer.....	4.00 @	4.50
Hematite Ores, Non-Bessemer.....	3.25 @	3.50

Pig Iron.—The call for Foundry Iron has been stronger the past week, and sales of such Iron are believed to have been somewhat larger, however. The Pig Iron market in other respects has been without apparent change. Demand other than noted has not improved, and there has also been no improvement in prices. The sale of Bessemer Pig Iron by the Carnegie Company at low figures has not tended to improve the market either in demand or prices. To-day's quotations are as follows:

Nos. 1 to 6 Lake Superior Charcoal	\$16.50 @	\$17.00
Nos. 1, 2 and 3 Bessemer, per ton..	14.00 @	14.25
No. 1 Strong Foundry, per ton..	14.25 @	14.50
No. 2 Strong Foundry, per ton..	13.25 @	13.50
No. 1 American Scotch, per ton..	14.50 @	14.75
No. 2 American Scotch, per ton..	13.50 @	13.75
No. 1 Soft Silvery, per ton.....	14.50 @	15.00
Mahoning and Shenango Valley Neutral Mill Irons, per ton..	12.50 @	13.00
Mahoning and Shenango Valley Red Short Mills, per ton.....	13.00 @	13.25

Nails.—The mills are actively engaged upon old orders, and local quotations on both Wire and Cut Nails remain at \$1.65 per keg in stock.

Barb Wire.—The mills are crowded with orders, and prices are no better.

Old Rails.—Old Americans are quoted at \$18.75 @ \$19.25 per ton. The demand is fair.

Scrap.—No. 1 Railroad Wrought is quoted at \$15 @ \$15.50; Cast Scrap at \$12 @ \$12.50, and Wrought Turnings at \$8 @ \$8.50. The market is improving.

Bars.—Common Bar is quoted at 1.65¢ @ 1.70¢, with demand fair.

Detroit.

WILLIAM F. JARVIS & Co. of Detroit, Mich., under date of October 24, write: While there has been no general advance in prices, certain Southern furnaces have put their figures up from 25¢ to 50¢ per ton and are maintaining these figures. Some other Southern makers, not so well supplied with shipping orders, are booking a certain amount of tonnage at the old figures. Northern furnaces have made no change in their prices, but all grades of metal are decidedly firmer. The low end has now been reached and passed, and every furnaceman is encouraged and looking for better figures. On a supply and demand basis, probably the makers of Lake Superior Charcoal Pig Metal are in better position to day than any other branch of Pig Iron manufacturing. The demand continues very good, and a report of stocks on hand shows a considerable reduction and future curtailed production is assured, quite a proportion of the furnaces having made no purchases of Ore, and the near close of lake navigation will prevent any delivery. Certainly during the long continued depression Charcoal Iron interests in this district have not looked as bright. It would seem impossible to check some considerable advances. A regular steady trade in Finished Material at good figures has been seen during the past week. With a strong market we make quotations as follows:

Lake Superior Charcoal, all numbers.....	\$16.50 @	\$17.50
Lake Superior Coke, Bessemer....	16.00 @	16.50
Lake Superior Coke Foundry, all ore.....	16.00 @	17.00
Standard Ohio Blackband (40 per cent.)..	16.50 @	17.00
Southern No. 1.....	14.50 @	15.00
Southern Gray Forge.....	12.50 @	13.00
Jackson County (Ohio) Silvery.	17.75 @	18.25

The consolidation of the Colorado Coal and Iron and the Colorado Fuel companies was ratified in New York by the stockholders. The capital of the new company is \$9,250,000.

New York.

Office of *The Iron Age*, 96-102 Reade street, NEW YORK, October 26, 1892.

Pig Iron.—As yet this market has not felt much the better tendency so general in the other distributing centers. Business continues on a moderate scale. We quote Northern brands at \$15 @ \$15.50 for No. 1; \$14 @ \$14.50 for No. 2; \$13 @ \$13.50 for Gray Forge, tide-water. Southern Iron, same delivery, \$14.75 @ \$15 for No. 1; \$13.75 @ \$14 for No. 2 and No. 1 Soft; \$13.25 @ \$13.50 for No. 2 Soft; \$12.75 @ \$13 for Gray Forge.

Ferromanganese.—There has been quite an active market, in moderate lots, the aggregate figuring up very well. Foreign Ferro has even captured some Western trade, particularly when water transportation has been available. We quote \$60 @ \$60.50 for 80 % Ferro, and 20 % Spiegeleisen, \$26 @ \$26.50, noting a sale of 300 tons.

Billets and Rods.—There has been quite an active inquiry for Soft Steel Billets, and some demand for High Carbon Stock, with a number of good sales, extending in at least one case over six months' delivery. There has also been a small business in foreign Billets for the export Wire trade. Wire Rods are dull at \$33.50 @ \$33.75 for domestic and \$40.50 @ \$41 for foreign. Billets may be quoted \$30 @ \$30.50 for foreign.

Steel Rails.—The mills report no sales of any consequence and note that there is very little coming up, since there is only one good-sized lot under negotiation. A meeting of the manufacturers is to be held in this city next week, at which the condition of the trade will come up for discussion. We continue to quote \$30 at Eastern mill.

Manufactured Iron and Steel.—No contracts of any consequence have been closed in this market during the past week. While some Plate mills are asking and getting higher prices, others are shading a little to secure additional work. In explanation of sales of foreign Beams in this market, the point is made that the German makers who have had a syndicate in the past are now industriously cutting one another's throats. We quote Beams 2.35¢ @ 2.75¢ for small lots and 2.20¢ @ 2.50¢ for round lots, according to sizes; Angles, 1.95¢ @ 2¢; Sheared Plates, 1.85¢ @ 2.10¢; Tees, 2.30¢ @ 2.75¢; Channels, 2.25¢ @ 2.50¢, on dock. Car Truck Channels, 2¢ @ 2.10¢. Steel Plates are 1.09¢ @ 2¢ for Tank; 2.20¢ @ 2.25¢ for Shell; 2.50¢ @ 2.65¢ for Flange; 2.6¢ @ 2.75¢ for Marine, and 3¢ @ 3.25¢ for Fire Box, on dock. Refined Bars are 1.67½¢ @ 1.9¢, on dock; Common, 1.55¢ @ 1.60¢. Scrap Axles are quotable at 1.95¢ @ 2.10¢, delivered. Steel Axles, 1.95¢ @ 2.1¢, and Links and Pins, 2¢ @ 2.20¢; Steel Hoops, 1.90¢ @ 2¢, delivered.

Track Material.—We quote Spikes, 1.90¢ @ 2¢; Fish Plates, 1.60¢ @ 1.65¢; Track Bolts, square nuts, 2.40¢ @ 2.60¢, and hexagon nuts, 2.70¢ @ 2.80¢, delivered.

Metal Market.

Copper.—Operations in Ingot have been on a smaller scale during the past week, and there is hardly the display of buoyancy that appeared on the surface a week or ten days ago. According to current report manufacturers of Brass and Copper goods have orders in hand sufficient to keep their works in full operation during the balance of the year, and it is stated also that the consumption of Copper for electrical purposes is quite large. It would

appear to be the fact, however, that necessary supplies are secured without difficulty by large consumers, and that extreme prices quoted last week are the exception rather than the rule where business of any magnitude is concerned. In other words, transactions in Lake Superior Ingot at above 11¢ have been extremely rare, while 11¢ @ 11½¢ stands as the range on Electrolytic and 10½¢ @ 10¾¢ the figures for common casting brands. The newest item in connection with the Anaconda Company is that lack of water is rather embarrassing, and that, if worked to fullest capacity under existing conditions, the plant cannot turn out mineral at the rate of the production of the first half of the year. Whatever the facts in this connection, it is plain that there is enough Copper to go around, and that the market is stronger on the surface than beneath.

Pig Tin.—As far as reported the speculative movement for the week involves not over 200 tons. The consumptive outlet has been carefully looked after, however, and the movement thence is doubtless fully up to the average for the season. While the consumption is on a quite large scale and sufficient to have some force, prices are still moved about at the will of the leading manipulators. Thus, in harmony with lower cables from London, spot rates have dropped to 20.55¢ @ 20.60¢, net cash, for 10-ton and larger lots, and current month deliveries to about the same level. Out-of-town cash orders are still carefully taken in hand on the basis of local quotations, and ordinary jobbing lots have commanded nothing more than the usual difference. The available supply for this market is figured out as being larger than usual during the latter part of October, but the statistical position is still practically without weight as a guide to values here or in the European markets.

Pig Lead.—Shipments hence from the Western sources of supply have been dilatory, and buyers who needed stock for immediate use have therefore had to pay 4¢ for spot parcels. For near future shipment there have been sales at 3.95¢, however, and the offering at that rate is quite free at this writing. In short, the market is weak where round lots for future delivery are concerned and extremely tame also, but fairly steady for spot parcels.

Spelter.—Business to a very good aggregate amount has been done at about 4½¢ for Philadelphia and 4¼¢ for Pittsburgh delivery. Sales in the East are remarkably slow, however, and the demand is without greater spirit owing to slow arrivals. Spot prices are firm at 4.45¢ upward for good Western brands, but near future shipments could be had at 4.40¢ in round lots. The supply at producing points is large and the offering quite free, but not particularly urgent.

Antimony.—There is about the average demand and prices are quite firm, with the range again a shade higher on some brands. Current quotations are 10½¢ @ 10¾¢ for Hallet's, 11¢ for LX, 11½¢ for Crown and 12¢ for Cookson's in round lots.

Tin Plate.—Business has been very moderate and the market is in rather poor shape. Spot Stock brings stiff prices, owing to moderate supplies and rather poor assortments, but orders for round lots of ordinary Cokes, Charcoals or Terns for future delivery have been filled at slightly easier prices. We quote as follows: Coke Tins—Penlan grade, IC, 14 x 20, scarce; J. B. grade, do., \$5.37½; Bessemer do., \$5.30 for full weight; \$5.15 for 100 lb, \$5.05 for 95-lb, \$4.80 for 90-lb Siemens Steel scarce. Stamping Plates—Bessemer Steel, Coke finish, IC basis, \$5.60 @ 5.65; Siemens Steel, IC basis, \$5.75; IX

basis, \$6.80 @ \$6.85. IC Charcoals—Melyn grade, ½ x assortment, \$6.40; Crosses, \$8; Allaway grade, any assortment, \$5.70; Crosses, \$7.20; Grange grade, any assortment, \$5.80; Crosses, \$7.25. Charcoal Terns—Worcester, 14 x 20, \$5.70; do., 20 x 28, \$11.40; M. F., 14 x 20, \$8; do., 20 x 28, \$15.75; Dean, 14 x 20, \$5.45; do., 20 x 28, scarce; D. R. D. grade, 14 x 20, \$5.35; do., 20 x 28, \$10.65; Alyn, 14 x 20, \$5.40; do., 20 x 28, \$10.70; Dyffryn, 14 x 20, \$5.65; do., 20 x 28, \$11.10. Wasters—S. T. P. grade, 14 x 20, \$5.10; do., 20 x 28, \$10; Abercane grade, 14 x 20, \$5; do., 20 x 28, \$9.80.

Financial.

The leading feature in the week is dearer money, both in this market and in London. In New York the supply was good, though at full rates, call money, which loaned at 2 per cent. or less last summer, having advanced meanwhile to 4 per cent., while time money, which could have been had at 3 per cent., now commands 6 per cent., and mercantile paper is not discounted at less than 5 per cent.; even at this figure very few city banks are in the market. It is remarked, however, that the usual autumn stringency is about a month late. If signs are not at fault, the disturbing influence is the enlarged supply of currency from Treasury operations, reckoned at \$90,000,000 during 13 months to October 1. Although requirements for moving the crops are less than usual, it is surmised that but for the excess of currency there might have been serious embarrassment. The bank return showed a loss of \$31,100 in cash and a gain of \$1,793,375 in reserve, making this item \$2,332,425. The failure of the old established wholesale grocery house of C. Burkhalter & Co., with an assignment to Charles H. Fancher, president of the Irving National Bank, with preferences aggregating \$183,168, caused much surprise, and an alleged abuse of credit threatens prolonged litigation.

Four business days in the Stock Market were characterized by moderate activity, but transactions were affected by dearer money. Reports concerning the alleged deal between the New England and the Boston & Maine were contradictory, but the impression remains that nothing definite may be expected for some time to come, perhaps depending on the results of litigation pending in the affairs of the Reading Company. The advance of the Bank of England rate of discount to 3 per cent. was unfavorable to the London market for Americans, although it was understood that two or three lots of bonds amounting to about \$3,000,000, have been marketed abroad this month. To these transactions the recent drop in the rates of sterling exchange is supposed to be due. On Monday Reading was affected by reports of a serious accident on the road, but there was good buying of the grangers, Atchison, Topeka & Santa Fé, and some others, the market looking strong, with New England the favorite.

United States bonds were firm at the following quotations:

U. S. 4½s, 1891, extended.....	100½
U. S. 4s, 1907, registered.....	114½
U. S. 4s, 1907, coupon.....	114½
U. S. currency 6s.....	107½

The unfavorable tendency of our foreign trade, which has been noticed since the beginning of the fiscal year, was especially marked in September last. In September, 1891, the exports exceeded the imports \$15,196,378, while in September, 1892, the imports exceeded the exports \$6,528,764, in spite of the fact that the shipments of specie exceeded the receipts by upward of three and a half million dollars. Otherwise stated, the imports of merchandise in September, 1892, exceeded

the exports of produce and manufactured goods \$10,043,497, while in September, 1891, the exports, exclusive of specie, exceeded the imports \$21,349,348. This makes a relative change in the balance of trade amounting to upward of \$31,000,000 in a single month. The decline in exports is largely due to the lateness of the cotton crop, but other causes of disturbance are attributable to the operation of the silver law of 1890, which some of our best financiers agree should be promptly repealed, to avert further mischief. The balance of trade for the nine months ending September 30 was \$73,887,900 as compared with about \$80,500,000 a year previous.

Sterling exchange was weak in consequence of advanced rates of discount in London and closed at \$4.85 @ \$4.87. Russia, it is reported, will require another million sterling and Egypt £700,000. According to a St. Petersburg paper Russia has on deposit in London, Germany and Paris, £19,000,000.

Depression in the wheat market is not relieved, the visible supply having gained 4,311,000 bushels, so that the crop movement at the eight leading primary markets already reaches 100,000,000 bushels, against 85,000,000 a year ago, which, according to the *Northwest Miller*, is 15% higher than ever before. Corn sympathizes, but is bought more freely at the decline. Hog products are firm, but cotton is again lower, attributed to weakness in Liverpool. In dry goods there is a decided improvement, with larger sales, particularly in print cloths. The South is buying more freely.

Imports.

Hardware, Machinery, &c.

Am. Tobacco Co., Mach'y, pgs., 12
Baker, Hermann & Co., Hardware, cs., 3, Arms, cs., 36
Eggenberger, E., Mach'y, pgs., 8
Folsom Arms Co., Arms, cs., 4
Hobbs Hardware Co., Mdse., cee., 1
Hammel, Ripander & Co., Files, cs., 4
Jackson, W. H. & Co., Files, cs., 7
Kennedy & Moon, Mach'y, cs., 3
Krauss, John, Hardware, cs., 14
Meacham Arms Co., Arms, cs., 4
Richard, C. B. & Co., Ironware, pgs., 204
Schoverling, Daly & Gales, Arms, cs., 8
Safety Car & Heating Company, Ironware, cs., 44
Smith, R. & C., Mach'y, pgs., 7
Webb, J. Beaver, Galvanized Steel Anchors, 20.
Werlemann, H., Arms, cs., 28
Wiebusch & Hilger Co., Arms, cs., 20
Order: Mach'y, pcs. & pgs., 44; Gun Barrels, cs., 7.

Coal Market.

The two branches of the Coal trade, Anthracite and Bituminous, are of late subject to influences exceedingly diverse, and results in either case are unsatisfactory. Anthracite is in such excess that the combine prices are maintained so far above the normal level with reference to demand that outsiders or independents are cutting heavily. Bituminous, on the other hand, is scarce, on account of difficulty in procuring cars, as is usual at this season of the year; and the truth is, however the fact may be disguised, that the scarcity is due to the great number of unloaded cars side-tracked on the Reading system. Under these circumstances, quotations for Anthracite are of no value, as consumption in the wholesale market is by no means uniform. Besides, the necessity for curtailing production will be urged at the meeting of agents 27th inst., and the decision may have an important bearing on the situation. As the case stands the combine report trade very dull, as customers are holding off.

Bituminous Coal, as above intimated, is firm and buyers who have no contracts have difficulty in finding supplies. Prices are \$3.25 @ \$3.50 alongside, or \$3.15 @ \$3.25 f.o.b. Higher prices are confidently predicted by some of the dealers.

Anthracite production for the week ending 15th inst. was 963,000 tons and since January 1 the amount is 32,540,000, an increase of 1,921,000 over last year. Reading reports for the week ending 22d inst. 515,000 tons, and the Pennsylvania reports an increase for the year of 529,800 tons. It is of interest to note that the Norfolk & Western Railroad's tonnage statement shows that the Pocahontas field has outdistanced all rivals for output, including the Cumberland and Clearfield.

British Iron and Metal Markets.

[Special Cable Dispatch to The Iron Age.]

LONDON, WEDNESDAY, October 26, 1892.

The movement in prices of Pig Iron warrants has been almost steadily downward. There was some firmness in Scotch early in the week, due to purchases for account of small "bear" interest, caused by apparent scarcity of cash warrants; but subsequent freer offering, along with advance in the bank rate of interest and more disposition to realize on the part of holders, brought about a reaction to 41/. Cleveland warrants dropped sympathetically to 37/6, and Hematites to 47/4½. There are now 77 Scotch furnaces in blast, and shipping brands are more plentiful. Cleveland makers find difficulty in securing orders, at modified prices, for forward delivery.

After advancing somewhat, prices for Straits Pig Tin receded £1. 10/, but the speculation is still confined almost wholly to inside operators, and the market is controlled chiefly by a few leading operators. This interest, lacking followers, is apparently undecided and trading cautiously at the moment.

Copper has averaged somewhat lower, with about 5/ decline on Merchant Bars during the week. Realizations by speculative holders caused a decline early in the week, from which a recovery took place later. Subsequently there was another slight downward movement, due to speculative pressure; but purchases for consumption have been better and the offering at present is moderate.

In Tin Plate there has been more doing for American account. Several parcels of Frisco Grade Bessemers were sold at 12/, f.o.b. Liverpool, for immediate shipment. A fair business has been done also in Oil Sizes for Russian account. The Morriston Tin-Plate Works have stopped. Over 100 mills are now idle.

Scotch Pig Iron.—Business has been moderate and prices, while somewhat irregular, have undergone no radical change,

No. 1 Coltness, f.o.b. Glasgow.....	55/
No. 1 Summerlee, " ".....	54/
No. 1 Gartsherrie, " ".....	52/
No. 1 Langloan, " ".....	53 6
No. 1 Cambro, " ".....	44 6
No. 1 Shotts, " at Leith.....	53/
No. 1 Glengarnock, " Ardrossan.....	50/
No. 1 Dalmeilington, " ".....	48/
No. 1 Eglington, " ".....	47/
Steamer freights, Glasgow to New York, L.; Liverpool to New York, 7/6.	

Cleveland Pig.—Dealings have been on a moderate scale and the market is easy, with makers offering at 37/9, f.o.b. shipping port, for No. 3 Middlesborough.

Bessemer Pig.—Although warrants have declined, makers are slow to grant

concessions, and quote 48/6 @ 49/ for West Coast brands, Nos. 1, 2 and 3, f.o.b. shipping port.

Ferromanganese.—The market remains quiet and without change. English 80 % quoted at £11. 11/3, f.o.b. shipping port.

Steel Rails.—There is but little doing in this line, and buyers and sellers are still apart. Heavy sections quoted at £4. 2/6, f.o.b. shipping port.

Steel Billets.—Trade is slow and the market rather in buyer's favor. Bessemer, 2½ x 2½ inches, quoted at £4. 2/6, f.o.b. shipping point.

Steel Blooms.—A slow market with prices not quotably lower, but rather easy. Makers quote £4 for 7 x 7, f.o.b. shipping point.

Steel Slabs.—There is little doing, and the market is still rather weak. Bessemer quoted at £4., f.o.b. at shipping point.

Old Iron Rails.—Dealings on a moderate scale, and the demand slow, but holders make no concessions. Tees quoted at £2. 15/ and Double Heads at £2. 16/3 @ £2. 18/9, f.o.b.

Scrap Iron.—Moderate quantities only are selling, and prices have undergone no change. Heavy Wrought Iron quoted at £2. 5/ @ £2. 7/6, f.o.b.

Crop Ends.—The market remains quiet and unchanged. Bessemer quoted at £2. 10/ @ £2. 12/6, f.o.b.

Manufactured Iron.—While fair in volume individual purchases are on a moderate scale and chiefly at prices that have ruled for some little time past. We quote, f.o.b. Liverpool:

Staff, Ordinary Marked Bars	£	s.	d.	£	s.	d.
" Common	8	5	0	8	5	0
Staff, Bl'k Sheet, singles	6	7	6	6	10	0
Staff, Bl'k Sheet, singles	7	5	0	7	5	0
Welsh Bars (f.o.b. Wales)	5	7	6	5	10	0

Tin Plate.—Although more business has been done prices are still rather easy. We quote, f.o.b. Liverpool:

IC Charcoal, Alloway grade	13 6 @ 14/
IC Bessemer Steel, Coke finish	12/ @ 12 3
IC Siemens	12 3 @ 12 6
IC Coke, B. V. grade 14 x 20	12/ @ 12 3
Charcoal Terme, Dean grade	11 9 @ 12/

Pig Tin.—The market closes firmer and moderately active, with Straits quoted at £94. 12/6 for spot and £95. 2/6 for three months' futures.

Copper.—Market closes quiet but steady. Merchant Bars quoted at £45. 12/6, spot, and £46. 2/6, three months' futures. Best selected, £50.

Lead.—The market quite and prices easy with £10. 5/ quoted for Soft Spanish.

Spelter.—The market remains quiet but steady, with £18. 17/6 quoted for ordinary Silesian.

The Finishers' Association.

As stated in the last issue of *The Iron Age*, the committee of ten appointed to ascertain the wishes of all workers in finishing departments of rolling mills had a meeting in Pittsburgh on Saturday last. John Carey, roller, of Pittsburgh presided. The question of the advisability of breaking away from the Amalgamated Association was discussed again, and it was decided to effect a permanent organization. A committee consisting of eight members was appointed to draft constitution and

by laws. This committee will probably report at the next meeting in Youngstown next Saturday, when officers may be elected. They will organize lodges at every mill.

The Amalgamated Association was formed in 1876 by the rollers, heaters, roughers and catchers joining the men in the other departments of the mills. Previous to this the finishers had an excellent organization of their own, known as the Association of Iron and Steel Rollers, Roughers, Heaters and Catchers. At the time of the organization of the Amalgamated Association David Plaut of Columbus was president. At that time there was great opposition among the members to joining the new organization, for the reason, as they said, that the finishers had nothing to gain. Everything has gone well until this year, when they had to suffer a 10 per cent. reduction while other branches in the association went without a cut. Then the question of reorganizing separately was broached and immediate steps taken with that object in view. It is said that the new organization will act harmoniously with the present Amalgamated Association of Iron and Steel Workers.

Pittsburgh News.

(By Telegraph.)

S. A. Ford, chief chemist at the Edgar Thomson Steel Works, has tendered his resignation. The cause which led Mr. Ford to take this step is given as ill health.

Within the last few days a 48-ton armor plate has been successfully rolled at the Homestead Steel Works, and has passed all inspections thus far.

The Carnegie Steel Company, Limited, have placed an order with Wm. Tod & Co., Youngstown, Ohio, for a leveling plate 30 feet square, and weighing 150 tons, which will be added to the equipment of the slabbing mill at the Homestead Steel Works. It will be constructed in eight pieces, each 7½ feet wide, 15 feet long and 18 inches thick. Each piece will be planed and bolted together, forming a solid floor.

The reports that the Beaver Falls Mills will be started up on November 1 are premature. When the employees who broke their contract with the firm signify their desire to return to work on terms to be proposed by the firm the question of starting the Beaver Falls Mills will be taken up. Until this is done, however, the plant will be allowed to remain idle.

F. D. KINGSEED has admitted his brother, C. E. Kingseed of Cleveland, Ohio, into partnership in his Hardware business at Fostoria, Ohio. The new firm will be known as Kingseed Bros., and the business will be continued, we are advised, on a largely increased scale.

THE JNO. M. WADDEL MFG. COMPANY, Greenfield, Ohio, issue a circular in which reference is made to the decision in the suit brought against them by the Bensinger Self-Adding Cash Register Company to establish the latter's title to the former's patent. The decision in question, which was rendered in the Circuit Court of the Western Division of the Southern District of Ohio, dismisses the complainants' bill of complaint, with costs. The Jno. M. Waddel Mfg. Company also take occasion to assure their customers that they will be fully protected in purchasing their registers.

HARDWARE.

Condition of Trade.

TRADE CONTINUES in good volume, with a general activity with both manufacturers and merchants. It is, perhaps, on the whole hardly as good as a week or two ago, which results in part from the fact that the retail trade have generally laid in their stocks, and in part from the fact that more attention is being given to politics with the near approach of the election. The Columbian celebrations have also had a deterrent effect on purchases. There is, however, a large movement in the aggregate, and there is no reason for complaint or disappointment. In a few lines manufacturers are unable to supply goods as promptly as their customers desire, but in most instances this condition is owing to special causes and does not reflect the state of the market as a whole, there being little difficulty in obtaining prompt shipments on nearly all lines. Manufacturers, however, generally refer to the volume of sales as being large, and comparatively few are able to accumulate stocks. There have been some large purchases in some staple lines, indicating a conviction on the part of buyers that the goods at the low prices now ruling can be safely bought. There is an excellent demand for seasonable specialties, which the indications of the approach of winter have stimulated. Advices from retailers reflect a very satisfactory business and a prosperous condition of things throughout the country at large. The low prices that rule in the Cotton market produce a quiet condition in parts of the South, but the general conditions in the Southern States are regarded as favorable and promising a good business in the future. As touching upon this question, the advices which we give on another page from a leading Southern house will be of value to those who desire to be definitely informed in regard to the state of business in this important section.

Chicago.

(By Telegraph.)

Among the visitors to the Columbian Celebration last week were a great many Hardwaremen from all over the Northwest. Usually visitors do not give much attention to trade under such circumstances, but this occasion was an exception. Numerous orders were placed with all jobbing houses. The two days' holi-

day caused an accumulation of mail orders, and consequently this week finds the Chicago jobbers busier than at any previous time this fall. The colder weather of the past few days has also had an effect on some classes of goods for which the demand has of late been lagging. The Tinware houses report an especially heavy rush. Small goods are very active with them, but Stamped Ware generally, as well as Japanned Ware, Coal Hods, Stove Boards, &c., are quite lively. Second orders long delayed are now coming in for seasonable goods. From present appearances October will go out with a good record in spite of the falling off early in the month.

St. Louis.

(By Telegraph.)

The Hardware trade continues much in the same condition as last noted. Barb Wire and Wire Nails are weak, but with the consolidation of the five Wire mills as noted last week it seems more than probable that prices will improve. The cold snap which has prevailed throughout this section during the past week has naturally increased the demand for Stoves and kindred goods. Copper goods are firmer, in sympathy with the advance in raw material, and house-furnishing goods of every description are in urgent demand. Heavy Hardware is in good demand, and indications point to a steady trade in all lines well up to the holidays. Some little trade is doing in Builders' Hardware, but it is mainly in the shape of material needed to finish work now in progress, and demand will necessarily be limited.

Notes on Prices.

Cut Nails.—The Cut Nail market is in a peculiar condition, and is being regarded by the trade with especial attention. The demand continues large, there having been recently some heavy purchases, and orders are still being received for large quantities of Nails. As a result of this state of things increased strength in prices would naturally be looked for, but the somewhat low quotations which have recently been ruling are still continued, and within the past week some exceptionally low figures have been made. In the West \$1.40, f.o.b. mill, has been made, and it is reported that this figure has been shaded on some large orders. In the East prices are still nominally on the basis of \$1.65 for Steel Nails in carload lots, at mill, on a 25 or 35 cent average, freight being equalized; but in many cases the manufacturers deviate from this price, and Nails can be bought at \$1.40 to \$1.45, f.o.b. mill, in round lots. Notwithstanding the fact that the demand is large and increasing and promises to continue for some weeks, the manufacturers are evi-

dently anxious for orders. Steel Nails from store in New York are quoted at \$1.85 and Iron Nails at \$1.82. The following are the quotations for carload lots on dock:

	Iron.	Steel.
25 to 30 cent average extra.....	\$1.77	\$1.80
31 to 39 " " " " " " " " " " " "	1.72	1.75
40 to 49 " " " " " " " " " " " "	1.67	1.70
50 cents and up " " " " " " " " " " " "	1.62	1.65
Lots of 1000 kegs, 5 cents a keg less than above prices.		

Chicago, by Telegraph.—The local makers are very busy and increasing their daily output under the stress of a rapid stream of specification, as well as new orders. The advance in Steel Billets has stiffened the views of manufacturers, and they are now asking 5 cents advance for November. An appearance of weakness has recently clouded the local market, but it is understood to have been caused by a contest for certain trade between some of the large dealers. Manufacturers still quote \$1.62½ to \$1.65 on 30 cent average, while jobbers' prices range from \$1.65 to \$1.70 from stock.

Wire Nails.—The Wire Nail market has shown no material change since our last issue. The demand is excellent, there having been some large orders placed, and many smaller ones which aggregate a heavy volume. The mills in most cases are, however, in a position to fill orders without delay. Quotations remain on the basis of \$1.50 for carload lots at mill, a figure which is, however, shaded under the pressure of large and attractive orders, some of which have been placed at \$1.45.

Chicago, by Telegraph.—The Wire Nail factories are being driven to their full capacity to supply the demand. Agents state that almost as soon as a sale is made the buyer telegraphs to know when the Nails will be shipped. The large dealers have continued their policy until now, of making daily specifications for such Nails as they require, but the advance in Steel Billets has awakened them up to the desirability of laying in a stock at current prices, and inquiries are coming in for round quantities for future delivery. One of the largest makers has advanced his price on account of dearer raw material, and now asks \$1.65, Chicago. If the advance on Billets is maintained the weakness in Wire Nails of the past fortnight will soon be succeeded by strength, as the market is in good shape to sustain an advance, owing to the conservative manner in which merchants have been ordering for some weeks. The current price is \$1.60 Chicago from factory, but the market is feverish and this may be regarded as an inside figure. Jobbers quote \$1.75 from stock.

Barb Wire.—A good business in Barb Wire is doing, and the manufacturers have little reason for complaint in regard to its volume. Prices, however, are wanting in strength and Barb Wire can be purchased

at lower figures than a few weeks ago. Some of the mills are willing to accept \$2.40 f.o.b. for large lots; others, however, refusing to meet this figure. The market is accordingly represented by the range, \$2.40 to \$2.50, f.o.b., mill. In the New York market prices for local demand are well maintained on a basis of \$3.10 for small lots, with 10 cents off on carloads.

Chicago, by Telegraph.—Some orders for spring delivery are being booked by the makers, but the demand for early shipment continues quite light. Carload lots of Painted are quoted at \$2.15, and Galvanized \$2.60. Jobbers quote \$2.35 and \$2.80.

Screws.—The Screw market is in excellent condition, there being a very satisfactory understanding between the manufacturers, which results in steady prices. Many of the jobbers, however, have large stocks which were purchased at lower prices than those now ruling, and which they are selling freely lower than the goods can be bought from the manufacturers.

Carpet Sweepers.—The following is the price-list of the extensive line of Carpet Sweepers manufactured by the Goshen Sweeper Company, Grand Rapids, Mich.:

	Per dozen.
<i>Ladies' Friend</i> , oak-stained top.....	\$15.00
" " No. 2, ".....	16.00
<i>Advance</i> , stained dark and oak.....	18.00
<i>Our Leader</i> , antique oak.....	19.00
<i>Triumph</i> , oak.....	20.00
<i>Goshen</i> , oak stain, sixteenth century and antique.....	21.00
<i>Supreme</i> , dark stain, antique and century.....	22 00
<i>Easy</i> , dark stain, antique and century..	22.00
" nickel, natural mahogany, dark, antique and century.....	24.00
<i>Gilt Edge</i> , dark, antique and century..	24.00
<i>Acme</i> , antique and century.....	26.00
<i>Imperial</i> , walnut, mahogany, sycamore, antique, century and English oak....	26.00
<i>Grand Republic</i> , antique oak.....	30.00
" " " " ".....	33.00
<i>Banner</i> , natural, century and antique..	22.00
<i>The Star</i> , " " " " ".....	21.00
<i>Reliable</i> , " " " " and birch.....	22.00
<i>The Rapid</i> , japanned, century, antique and birch.....	22.00
<i>The Rapid</i> , antique, century and English, oak, walnut, mahogany and sycamore	24.00
<i>Our Own</i> , walnut, antique, century and English oak.....	27.00
<i>Model</i> , sycamore, antique, century and English oak.....	27.00

An order for 5 dozen Sweepers taken within six months secures a rebate of \$1 per dozen; for 10 dozen Sweepers, a rebate of \$2 per dozen, and for 25 dozen Sweepers, a rebate of \$3 per dozen, except on the Ladies' Friend Sweeper, the 10 dozen rebate on which is \$1.50 per dozen, and the 25 dozen rebate, \$2 per dozen.

Glass.—A meeting of the Glass manufacturers was held at Cleveland, Ohio, during the past week. It was agreed to make an advance of 5 per cent. in prices of American Window Glass, to take effect November 1, which will make prices as follows: 80 and 15 per cent. discount for lots of 1000 boxes or more; 80 and 10 per cent. discount for car lots, and 80 and 5 per cent discount for less than car lots. The reduction made in discounts in September appears to have been made in the interests of uniformity in prices, as it was claimed at the time that Glass was being sold lower than August prices. Manufacturers report a good demand for nearly

all sizes of Glass, and local jobbers are doing a fair business. The present seems a favorable time to advance prices, enhancing as it does the values of stocks already purchased. Quotations on imported Glass remain unchanged at 80 per cent. discount, although it is probable that importers who are not busy would make slight concessions to procure desirable orders. Quotations remain unchanged until November 1, as follows: American Window Glass, 1000-box lots or more, 80 and 20 per cent. discount; carloads, 80, 10 and 5 per cent. discount; less than carloads, 80 and 10 per cent. discount. French Window Glass, 80 per cent. discount. American Plate is held at a discount of 50, 10 and 5 per cent., and imported Plate at a discount of 60 per cent.

THE
Hardware Club
of New York.

THE TRADE will be interested to learn that the obtaining of memberships for the Hardware Club of New York is progressing very satisfactorily, most of the leading houses in Hardware and related lines being represented and giving the project their hearty support. It is also interesting to note that among the members are the presidents and cashiers of several banks, and leading merchants in several other lines, who desire to avail themselves of the privileges offered by the club. The fact that the club is to be conducted on a scale commensurate with the importance of the interests represented attracts members, as business men are not slow to appreciate the advantages thus offered. It is desired that those who intend connecting themselves with the club should do so at as early a date as possible in order that the plans in contemplation may be carried into effect without delay.

It is hoped that there will be a large out-of town membership, so that the club may include many representative manufacturers and merchants who are in any way interested in the Iron, Hardware and related trades of New York. The usefulness of the club and the enjoyment of its members will obviously be greatly increased by having it the recognized headquarters of the Hardware trade of the city and country. To encourage such memberships the annual dues for non resident members have been fixed at \$25, which is half the sum paid by resident members. Those desiring to connect themselves with the club may address the secretary, John L. Varick, 107 Chambers street, New York, from whom information and blank forms of application for membership may be obtained.

Trade Items.

C. E. JENNINGS & CO., 79 Reade street, New York. An illustrated price-list in pamphlet form, showing their full line of Saws as they will appear in their complete catalogue now in press. Among them are Panel, Hand, Rip, Ship Carpenters', Ice, Compass, Double-Edge Pruning, Back, Plumbers', Butchers',

Hack and Wood Saws. They call attention to their new No 8 $\frac{1}{2}$ Framers' Saw, made from special steel, and designed particularly for framing and cutting heavy timber, being fitted with heavy birch handles to stand rough usage, as in mines, &c. Another feature to which attention is directed is that the illustrations have been prepared from photographs of the goods as they are sent to the trade, being *fac-similes* and in proportion.

GILLETTE CLIPPING MACHINE COMPANY,
155 East Twenty-third street, New York
in their advertisement in this issue call
attention to their line of Steam, Electric
and Hand-Power Clipping Machines, illus-
trations of which are given. Special at-
tention is directed to their Bicycle Clip-
per, which is referred to as the latest
addition to their line.

LINSLEY, ROOT & Co., New Haven, Conn., have purchased of Oscar Dikeman, trustee, the stock, fixtures and good-will of store formerly conducted by Weed & Clark, 55 Church street, in that city. They are intending to reassert the stock and to put in a complete line of Builders' Hardware, Cutlery, Plated Table Ware, Tools, Carriage Hardware, Blacksmiths' Supplies, Fishing Tackle, Sporting Goods, Paints, Oils, Varnishes, &c. Arthur C. Root will have immediate charge of the new store, Robert C. Lightbourn of the Broadway store, while Frank J. Linsley will divide his time between the two establishments.

THE H. P. NAIL COMPANY, Cleveland, Ohio, are now making a full line of Wire Carpet Tacks, in violet or blue finish, checkered heads and fine sharp points, also in bright and tinned finish. They are packed one dozen papers in a package and 100 of these packages in a case. They are also put up in toy kegs, tin boxes and paper boxes, each of these containing 250 Tacks. A label is put over the top of the toy kegs to prevent the covers coming off, and a label is put around the tin boxes. This convenient and attractive arrangement is referred to as an improvement over the ordinary style of packing.

PHILLIPS & Co., Niagara Falls, N. Y., have disposed of their Suspension Bridge store to a stock company, who will hereafter conduct it. The style of the new concern is the Oliver-Burleson Hardware Company. D. Phillips, F. W. Oliver and O. Phillips of Phillips & Co., hold an interest in the business. The company will be managed by W. E. Burleson, who is now and for the past ten years has been traveling salesman for the Russell & Erwin Mfg. Company. Mr. Burleson is one of the principal stockholders. The balance of the stock is held by the present foreman of the Suspension Bridge establishment, Herman Hertel. The new firm are looking confidently for a large increase in their business. Phillips & Co. at Niagara Falls will continue to push their business as energetically as in the past and report an excellent trade.

SAMUEL L. AVERY, who has for the past quarter of a century been identified with the manufacture of Agricultural Implements in Louisville, Ky., most of the time as president and vice-president of the large Avery factory, is about opening an office, and will furnish supplies to the manufacturers of Plows and Agricultural Machinery. Mr. Avery proposes to handle Improved Agricultural and Heavy Machinery. His dealings will be with the manufacturers and the jobbing trade of the Southern States. Mr. Avery's career has fitted him for such a field, in which success is bespoken him by his friends. His qualifications are shown in the success of the firm through so many years. Only a month ago he retired from the active management of the firm, but still remains a stockholder and director.

Trade in the South.

AS GIVING a general view of the condition of business in different parts of the South we take pleasure in laying before our readers the following advices, for which we are indebted to some of the leading houses in the principal cities. It will be observed that they give not only information in regard to the present volume of business, but also touch upon collections, freight questions, condition of crops and other matters which are closely connected with mercantile affairs. As giving a general view of the situation in the important markets to which they refer, these reports will be of particular interest.

Richmond, Va.

COTTRELL, WATKINS & Co.—Since September 1 of this year (up to which time our sales were about what they were to September 1 last year) our sales have been steadily increasing, running beyond what they were last year. Payments are made promptly, and more of our customers are discounting their bills for fall purchases than were able to do so last year. Notes given in July for accounts up to that time are promptly met at maturity, hardly an instance of renewal, or asking for future indulgence. We think the merchants in Virginia, West Virginia, North and South Carolina, Georgia and a part of Tennessee, are displaying a very conservative disposition in regard to going into debt. We have travelers living in all the different sections with which we trade, who can therefore see the merchants oftener; each trip around they sell goods to the same parties, showing that the merchants are buying little at a time, but buying more frequently—buying as they see their way of paying.

By diversifying the crops in North Carolina, South Carolina and Georgia, it is the general impression that the farmers have raised enough, as a rule, to live on, and the cotton crop of this season is almost just so much money in their pockets. From information received, in our opinion, it was raised at less cost than any previous cotton crop for a good many years.

From the above facts and conclusions, we think we can look upon the present state of trade, and the prospects for the coming season, as satisfactory and encouraging.

We hope that others have experienced the same satisfactory results as ourselves, and that our conclusions may be verified.

Atlanta, Ga.

BECK & GREGG HARDWARE Co.—While trade through our immediate section is not large it is fairly satisfactory, especially when we consider the fact that we have just passed through a heated campaign for the election of a Governor and members of the Legislature, in which

many of our farmers were ardent supporters of the Third Party movement, naturally arraying themselves against the merchants.

Sales as compared with last year for July and August were lighter this year, but the trade this season has been more uniform and is heavier for the months of September and October than for the same months last year. Cotton, which is our chief money crop, commenced to decline last year October 10, and continued to decline the entire season, whereas this season the price, although low, has been steady with an upward tendency. The weather has been and continues favorable for harvesting crops, it also improves the grade of cotton which will in a small degree compensate for the short crop. Collections are good and the disposition is to pay off all debts and prepare to produce cotton at a smaller cost by buying future supplies on a cash basis; this will have the effect of still further curtailing profits, which are already seriously low, but will to some extent eliminate the element of risk.

As a whole the outlook is encouraging and to the enterprising houses there are many avenues of profitable trade still open.

New Orleans.

A. BALDWIN & Co.—Business in this section for October has shown considerable improvement in all lines. The benefits from an exceptionally large crop of rice and the anticipation of a phenomenal crop of sugar in this State are being felt in New Orleans. It is fully 10 to 15 per cent. better than last season and the despondent tone that has pervaded the market for the past six months is gradually passing away. All indications point to considerable improvement for the fall trade, and most buyers are taking advantage of the present low prices to replenish stocks that have been allowed to fall to a very low margin.

Birmingham, Ala.

MOORE & HANDLEY HARDWARE COMPANY.—Replying to your inquiry relative to state of trade in this section, will say we have seen it much better, and do not anticipate any great increase in the near future. Nearly all of our furnaces are in blast, and have continued to make Iron notwithstanding the very low price. Necessity has compelled them to turn their attention to economical production, and doubtless they have learned many things in this direction which will be valuable when the reaction comes. They are in a healthy state and appear hopeful. Our coal mines are all running, and though the price of coal is cheap yet they seem to be prosperous, and like the furnaces, we take it they have learned some valuable points in economical production which will always keep them on the market. The long continued low price of cotton has had a depressing effect on the agricultural classes and those dependent upon them for trade. Cotton has been produced cheaper this year than ever before; but it will require time for these people to adapt themselves to the new condition. The trade in Builders' Hardware has been

light. Our people of all classes are hesitating about starting any new enterprises or stocking up heavily in any line of goods for fear of hostile legislation by Congress, which would be injurious particularly in the South. There has been an unusual amount of political agitation in Alabama this year, which was hurtful to business. We believe after the presidential election there will be a more hopeful feeling and improved trade.

Knoxville, Tenn.

C. M. McCLUNG & Co.—Business in this section of the country is in almost all lines fully up to last year, and but for the absence of railroad construction which prevailed three years ago, will compare favorably with any season since 1880. A bountiful crop is being harvested all over the South, and although prices are exceedingly low a general good feeling exists. A period of liquidation has been gone through during the past two years which has tended to balancing many accounts, which is another hopeful sign of prosperity.

Very little attention is being paid to politics on account of the approaching election, which teaches the important lesson that this country, with her inexhaustible mineral and agricultural resources, is safe it matters not whether the affairs of government are administered by the adherents of the policies taught by Thomas Jefferson or by Alexander Hamilton.

The question which affects the business interests of the South to a greater extent than any other is the excessive freight charges which prevail from all Eastern and Ohio river points to the interior cities and distributing points of the Southern States. Any argument which is advanced by the consignee or consignor looking to the placing of rates or classifications on a more favorable basis is met by the railroads that at present rates they are making no money, and that a large percentage of the roads in this section are now in the hands of receivers. This last assertion is true, and upon the surface it would look as though the defense of their position was a reasonable one. But to one who has studied the situation carefully, the fact develops that nearly all the Southern roads are bonded largely in excess of the cost of construction and equipment. In issuing bonds no calculation is made upon the cost of the property, but is based entirely upon the earning capacity, and this earning capacity is based upon the present excessive freight charges. Thus it will be seen that to pay the interest upon the enormous bonded indebtedness, and pay operating expenses in addition, the present high classifications and rates are necessarily maintained.

We see no chance for relief unless our National Congress will come to our aid by the enactment of a law which will cause bonded values to be based upon cost rather than upon earnings.

Through the untiring efforts of the Southern Hardware Jobbers' Association, the Southern Railway and Steamship Association, at its meeting in August, revised

the classification, which puts many articles in the Hardware line on a more favorable basis than heretofore, but not yet as low as they should be. This revised classification was to have gone into effect on September 19, but we are advised that, owing to the immense amount of work which preceded it in the office of the commissioner and secretary of the association, the compiling and printing of it has been delayed and is not yet completed. But as all good things come to those who wait, we are living in hope that it will go into effect at an early day.

Galveston, Texas.

J. S. BROWN & Co.—Trade is very quiet throughout Texas. There is no chance for a change until cotton advances, of which there is an unusually large crop.

Vicksburg, Miss.

LEE RICHARDSON & Co.—On account of the short crop of cotton in this section this season and the very low prices last season, we expect no big business this fall and winter, but still we look for sufficient trade to keep things going. Our planters and country merchants were better situated than was thought, to be able to go through the past three or four months. They are undoubtedly exercising the very strictest economy and making outlays for only absolute necessities. The entire business fraternity of our section seem to fully realize this fact and are governing themselves accordingly. Our merchants are not making the purchases they have been wont to do in the past, hence will not have the heavy payments to make this coming January and early spring. Although the outlook contains no boom in business here this approaching season, everybody is bright and doesn't appear to apprehend any disasters. Failures are phenomenally few for the tight times we have passed through, and we are not looking for failures in excess of last year, if so many. It would seem that our business men have cut their eye teeth, so to speak, and in all transactions conduct themselves with prudence and good judgment.

Henry B. Newhall Co.'s New Catalogue.

HENRY B. NEWHALL COMPANY, 105 Chambers street, New York, and 47 Pearl street, Boston, have just issued a catalogue devoted to Heavy Hardware, Building and Railroad Supplies, Malleable and Gray Iron Castings, Awning and Sailmakers' Hardware, Tackle Blocks, Ship Chandlery and Wire, as manufacturers and manufacturers' agents. The catalogue also contains a large number of tables of weights and dimensions of Bar Iron, Rods, Bolts, Nuts, Washers, Rivets, Chain and Wire, which will add to the value of the work as a text book. The catalogue is of convenient size, being about 6½ x 9½ inches, bound in cloth and contains 288 pages. The make-up of the book indicates care—cuts, prices and descriptions of goods being so arranged with reference to each other as to produce the

most satisfactory results. An exhaustive index occupies 15 pages in the front of the book, by which ready reference may be had to its contents. The paper is of fine quality, and the typographical work all that could be desired. The catalogue is very complete in the lines of goods which it represents, and as such will be appreciated by the trade.

Export Notes.

SIR RODERICK CAMERON of R. W. Cameron & Co. and W. H. Douglas of Arkell & Douglas, both of this city, were passengers on the outgoing Australian Mail Steamer "Alameda." Some interest is manifested in their movements by the export trade. Neither of these gentlemen has been to Australia for a number of years, and it is naturally conjectured that they go out in the interest of their respective freighting lines. Freight for Australia at present is scarce, the only Melbourne vessel now loading being the "Inverurie," which is likely to be in berth some time, the "Patrician" for Sydney recently closed, however, having been up but a short time.

Thomas A. Eddy of the Coombs, Crosby & Eddy Company is now on his way home from the Argentine Republic, having left New York early in May last.

F. M. Sutton, manager of the South African department for Arkell & Douglas, has returned from South Africa.

Mr. Green, traveling salesman for Strong & Trowbridge, has recently returned from Australia.

The Mexican Government has promulgated important tariff modifications. Import duties are considerably reduced on live animals, fresh and dressed meat, cotton goods, printing paper, cooking stoves and Virginia tobacco, while duties of a small amount are imposed on Iron and Steel for mining machinery, Agricultural Implements and a few other articles formerly free. The reduced rates are effective December 1 and the increased rates January 1 next.

The publication of the statistics on exportation from Mexico, for the fiscal year ending June last, indicates the continued progress of that country, the figures being \$75,467,000—a gain over the previous year of more than \$12,000,000, the largest gains being in precious metals. The United States takes two-thirds of all Mexican exports.

The final official action necessary to make operative the new commercial treaty between Spain and the United States has been taken, and the treaty is now ready to go into effect. The treaty was formally ratified by both governments, and should have gone into operation July 1 last, but some difficulties developing it became necessary to draw up what is diplomatically known as a *répertoire*—in other words, a list classifying all known

articles entitled to special privileges under the different schedules, which has now been done. For instance, it was an open question whether the general term "machinery" covered such items as Sewing Machines, the Spaniards claiming it did not, while our Government took the opposite view, and finally prevailed, so that now American Sewing Machines may enter Spain duty free. There were other points in dispute, which have been satisfactorily adjusted. The news from Madrid that the arrangement is considered favorable to Spain is received with satisfaction at the State Department in Washington, as no question has been raised of its beneficial influence upon the industries of this country, which seems to promise a long life to the new treaty.

An incident illustrative of the progress made in shipping and mail facilities was recently told by John G. Rollins, who received his business education with Geo. H. Gray & Danforth, Boston, Mass. This concern was a pioneer in the business of exporting, having commenced its career in 1821-22, doing a domestic business, sending goods to Canada for the first in 1849, and to Cuba and South America in 1853, later establishing a London branch in charge of John G. Rollins in the sixties for the transaction of European and Australasian business, which eventually reached a volume of \$1,500,000 per annum of strictly American goods. Many years ago it came to the knowledge of Mr. Gray that Charles Parker was manufacturing Coffee Mills at Meriden, Conn. He addressed a letter to Mr. Parker, saying he was convinced they could market some of the mills, and invited correspondence. There was no answer to this communication, except that one day a dray backed up to their receiving walk and delivered a load of Coffee Mills, having been driven from Meriden, something over 100 miles.

Export merchants complain of the increasing difficulty in doing a satisfactory foreign business, owing to the instability of silver and the demoralization in exchange, not alone in South America and the West Indies, but the Oriental countries, including India, China and Japan, the perplexity resulting from the fact that the importer is unable to anticipate what his goods will cost laid down. The tendency in India seems toward a gold basis, making the whole loss at once and having it done with.

Mexican exchange is a trifle better for the present, but this is regarded only as a temporary halt.

There appears to be a good probability that the new administration in Argentine, which will assume power January 1 next, will both reduce and remove import duties on lumber; but on what kinds and grades the reductions will be made cannot be definitely ascertained, for while the policy has been mapped out, the announcement of it will not be officially made until later.

It will be remembered that import duty on Case Oil was removed nearly a year ago, which stimulated shipments to such a degree that the market was soon glutted, there being little doing in that staple now.

Reciprocity seems to be accomplishing more in Cuba than was apparent at first, the opposition of the customs authorities there being to some extent overcome, but not entirely removed. It is hoped the understanding recently arrived at between this Government and Spain concerning the treaty relating to the Spanish Antilles will greatly simplify matters, and allow merchants at both ends to get all the advantages conferred by that instrument when equitably construed.

The steamship service recently attempted by Norton & Son to the River Plate, together with the occasional tramp steamer, by James E. Ward & Co., have been discontinued, at least for the immediate future, the charter of the steamer "Pharos," announced by Norton & Son, having been assumed by the United States and Brazil Mail Steamship Company.

This company commencing October 1 instituted a bi-weekly mail, passenger and freight line for Montevideo, Buenos Ayres and Rosario, having been awarded the mail contract by the United States postal authorities, which insures them considerable financial support. This venture is independent of their Brazilian business. It is evident there is not enough commerce to warrant the maintenance of three steamship lines to these ports, in the present condition of trade. Norton & Son and James E. Ward & Co. still dispatch their regular sailing vessels as heretofore.

James E. Ward & Co., agents of the New York & Cuba Mail Steamship Company, announce the raising of quarantine against vessels from the United States which have sailed since Wednesday, October 19. Such as cleared previous to that date will be subject to a detention of seven to thirteen days. The strict enforcement of quarantine regulations at Havana and other Cuban ports has occasioned much injury to the Ward line.

The Stacy Nail Bins.

THE STACY NAIL BINS, illustrations of which were given in *The Iron Age* of September 29, 1892, in connection with a description of the Hardware store of R. B. Owen & Sons, are manufactured by Stacy Mfg. Company, 30 South St. Clair street, Dayton, Ohio. They are made in single and double counters and wall cabinets, the latter having two rows of boxes, one above the other. The bins are designed especially for handling Nails, Nuts, Washers, Screws and like goods in a Hardware stock, and are so made that they can be crated knocked down, and shipped as dry lumber.

DONALD FRASER, Milwaukee, Wis.: Patternmakers' Specialties, Rapping Plates, Lifting Screws, Dowel Pins for wood patterns, &c. These goods are illustrated with prices and descriptions.

William Burt's Death.

THE NORWICH LOCK MFG. COMPANY, Roanoke, Va., advise us that last August their Western salesman, William Burt, died as the result of an accident, in Keokuk, Iowa. They sent the usual "In Memoriam" to the trade at the time, but have had a great number of requests to have the particulars published in *The Iron Age* for the benefit of his numerous friends. The particulars of this sad event are accordingly given below:

Wm. Burt, for many years traveling salesman in the West for the Norwich Lock Mfg. Company, died in Keokuk, Iowa, August 7, 1892, as the result of a peculiar and distressing accident. Mr. Burt boarded a train which left the Union Depot at 4.35 o'clock. Just below Taber & Co.'s mill a force of men were at work quarrying rock from the bluff. An unusually heavy charge had been set and just as the train reached a point opposite the quarry it exploded, blowing away a considerable portion of the bluff and hurling large pieces of rock in every direction.

A perfect fusillade struck the train and one large rock crashed through a window, striking Mr. Burt, who was sitting on the river side of the car, with awful force, breaking his lower jaw in four places and also the upper jaw, besides inflicting other injuries.

The train was immediately backed up to the station, whence he was taken to St. Joseph's Hospital, and, although he received the best surgical attention, the wounds proved fatal and he died the same night.

Mr. Burt was among the best-known traveling men in the West, and had a host of friends throughout the trade to whom his death will be a personal loss.

Relation of Profits to Amount Invested.

A CORRESPONDENT in Mexico, referring to the recent article on "Averaging Retail Profits," takes another basis for deciding which the best paying goods are than by comparison of gross figures. The matter is an interesting one, and we give his letter in full, as follows:

In an article appearing in *The Iron Age* of September 29, 1892, your correspondent gives a number of interesting computations on the subject of "Averaging Retail Profits" in our business, using the annual sales as a basis for his computations. This seems to me a misleading method of figuring, disguising, as it does, the true respective value of different lines of goods as money makers. It is the usual practice to judge of the prosperity of a business by the relation of net profits to the amount invested, and not by comparison of gross figures, such as annual sales and the per cent. of profit thereon. It is evident that many articles would show a small per cent. of profit on annual sales, while showing a large per cent. of gain on the amount invested—i. e., the average amount of stock. By comparison of the figures in the following table, it will be seen that on the basis of annual sales, the article B would appear by far the most desirable; yet its actual earning capacity is, by reason of slower sales, 25 per cent. less than that of article A:

	Stock.	Annual sales.	Gross profit.	Per cent. on sales.	Per cent. on investment.
A....	\$100	\$1000	\$100	10	100
B....	100	150	75	50	75

It is evident from the above, that many new articles, being as a rule slow sellers, will be found less profitable than staples, although the former have the advantage of a large per cent. of profit on annual sales.

Therefore, the per cent. profit on sales will not alone be found a safe criterion for judging of the true money-earning value of a line of goods. Better have 10 per cent. profit once a month than 100 per cent. once a year!

A Pleasant Anniversary.

THERE IS A GOOD DEAL of underlying sentiment and kindly feeling in connection with business, the expression of which it is pleasant to note. A few days ago Wm. J. Ladd of Sargent & Co. celebrated the anniversary of his wedding, having been married 25 years. He had anticipated giving a reception, but as one of the members of his household was ill the reception was abandoned and no announcement was made of the event. Mr. Ladd is a very busy man, but he could not allow the anniversary to pass unnoticed. He, therefore, took a few days from business, and with Mrs. Ladd enjoyed a trip to Philadelphia and the adjacent country. Unknown to him, however, some of his many friends also concluded that it would not do to let this anniversary pass unnoticed, and the result was that upon his return home he was much astonished to find silver tokens of esteem from many of his acquaintances. The present especially valued, because it was a complete surprise, was a trunk of antique oak lined with light blue silk containing a liberal supply of Gorham Ware consisting of 54 pieces. The Silverware is of the St. Cloud design, and each piece is engraved with the initial "L." This box bears an engraved plate with the dates 1867 and 1892 and the inscription, "Presented to William J. Ladd," followed by the names of the donors, who comprise the following gentlemen:

T. J. Atkins,	George Munson,
C. F. Wierper,	T. V. Hussey,
E. V. Bayard,	W. H. Fox,
R. R. Breese,	C. A. Upham,
C. H. Swiggett,	H. A. Graef,
W. L. Cooper,	S. V. Armstrong,
F. Guildener,	E. P. Dunning,
G. S. Shaw,	Howard Abeel,
H. B. Clapp,	A. B. Harrison,
R. Pearsall,	W. C. Thompson,
B. Luerssen,	J. Fred. Wright.

These names will be recognized by the trade as those of men prominent in the house of Sargent & Co., and associated in business with Mr. Ladd for many years. Mr. Ladd may well be proud of this handsome present, and will value it as a token of the regard in which he is held by his fellows. His many friends throughout the trade will also look upon it as most worthily bestowed, in view of the high esteem in which he is held, and will join with his associates in Sargent & Co. in

wishing him many anniversaries of his wedding day.

Trade Topics.

Fire Arms by Express.—From prominent manufacturers of Fire Arms we have the following communication with reference to the sending of Guns and Rifles by express, calling the attention of the trade to a matter of some interest:

We are having a large number of Rifles sent to us all the time to be bored up for the new 25 caliber cartridge. Parties not acquainted with the method of shipping Fire Arms sometimes will send a Gun without its being cased or securely wrapped in paper. In all such cases the express company charge three times the regular rate. Now, we claim it is the duty of the express agent, when he receives such a Gun, to notify the shipper, and then if he does not properly pack it, why, let him pay the extra. The express companies' orders are that all Guns or Rifles trussed or boxed or taken apart and packed in sole leather or canvas cases should go as merchandise. When not so packed three times merchandise rate, but all fire arms must be shipped at owner's risk, which necessitates, in case a Gun is properly done up, if it is broken in getting here, that customer must stand all cost in connection of repairing it, while the express company will charge three times the regular rate in case it is not done up just as they require it. We fail to see the consistency of this.

Right and Left Hand.—In regard to the right or left hand of hinges or doors, we have the following from a well-known Philadelphia Hardware house. The rule mentioned may be of service to some who have been perplexed in regard to the matter:

The writer was interested in reading the article on technical terms published in *The Iron Age* October 13. He well remembers that when a boy it was very perplexing to him to tell the hand of a door until his employer, the late Stanton L. Latham, a well-known Hardwareman, told him a very simple way to remember the hand of a hinge or door. The rule was to look at the back of your hand, the thumb would be the pin of the hinge, and by opening a hinge and slipping the joints apart you could tell at once the hand of the hinge. If you wished to know whether a door required right or left hand hinges, you had simply to place your hand on the jamb with thumb toward the side on which the door was to be hung; you could then see at once whether it would be right or left hand.

Price-Lists, Circulars, &c.

W. M. J. LLOYD MFG. COMPANY, Philadelphia, Pa.: Great American Meat Cutter. Illustrations, descriptions and prices are given of the various Machines, both Hand and Power Cutters, finished with aluminized-galvanizing. The front page of the cover has a humorous illustration of a Cutter operated by pigs.

BRYAN MFG. COMPANY, Bryan, Ohio: Wheelbarrows. Illustrations are given of a variety of styles of Barrows, together with descriptions, attention being directed to those embodying a system of braces bolted together. The Fay Combined Barrow is referred to as being well made, practical and convenient, and as of strong construction.

THE FOOS MFG. COMPANY, Springfield, Ohio: Scientific Grinding Mills. A catalogue largely devoted to these Mills illustrates and describes the various parts in detail. Illustrations and de-

scriptions are also given of Horse Powers, Corn Shellers, Corn Harvesters, Burr Mills, Farmers' Forge, Combination Anvil and Vise and Kit of Tools, all under the common name of Scientific. The covers of the catalogue are tinted with colored representations of farm life.

GEORGE H. HUTTON & CO., Baltimore, Md.: Specialties in Carriage Hardware. While Jump-Seat Irons receive special attention, the company also manufacture Lazy-Back Irons, Seat Rails, Improved Shaft Couplings, Patent Shafts, &c. Illustrations are given of these goods with price-lists.

ADAMS & WESTLAKE COMPANY, Chicago, Ill.: Brass Bedsteads. A supplementary catalogue illustrating the leading designs in their line of Brass Bedsteads. Attention is called by the company to the following points—material, construction, design, finish and casters. The makers state their Beds are made with Bessemer steel frames, solid brass ornaments, with all parts of the same style Beds interchangeable.

E. T. BARNUM, Detroit, Mich.: Wire, Iron and Brass Work for Builders, also Wire and Iron Goods. The two catalogues Nos. 540 and 542 illustrate Crestings, Tower Ornaments, Weather Vanes, Window Guards, Artistic Wrought Iron Grills, Tubular Railings, Sidewalk Tiling, Building Columns, Stable Fittings, Fenders, Screens, Counter Railing, Wire Doors, Brass Panels, Hitching Posts, Stairs and Railing, &c.

C. SIDNEY SHEPARD & CO., Chicago, Ill.: Fall circular of seasonable and other goods, under date October 6, 1892. The goods shown are Tin, Sheet Iron, Solder, Metal Shingles, Wire, Coal Hods, Dampers, Stove Boards, Elbows, Tea Kettles, Flower Pot Brackets, Coal Sieves, Lanterns, Oil Cans, Stove Polish, Coal and Fire Shovels, Fire Sets, &c.

OSHKOSH LOGGING TOOL COMPANY, Oshkosh, Wis.: Logging, River Driving Tools, and Mill Supplies. Illustrations are given of Peaveys, Cant Hooks, Landing Hook, Grappling Hooks, Pike Poles, Neck Yokes, Eveners and Whiffletrees, Skidding Tongs, Swamp and Loading Hooks, Timber Rollers, Sash and Door Trucks, Mill Hand Cart, Lumber Buggy, &c. Tabulated matter of interest to the lumber trade occupies a number of pages at the end of the catalogue.

THE WIRE GOODS COMPANY, Worcester, Mass.: Bicycle Spokes. These are shown in 16 styles, in the various forms of headed, upset, long upset, reduced and butted and threaded. They are furnished enameled, nickel-plated, plain or in any finish desired, and any style or size will be made to order.

It Is Reported—

That a new wholesale Hardware house was opened in Des Moines, Iowa, on the 3d inst. The style of the firm is the Patrick & Luthe Company. They occupy a large three-story brick block on the corner of Second and Walnut streets. The firm will do an exclusively wholesale business. Three traveling salesmen will be employed. Messrs Patrick & Luthe were for 20 years located at McGregor, Iowa, where they did a large business in both the retail and wholesale lines.

That William Sherman has opened a new Hardware store at Manchester, N. Y.

That the Hardware store of Bjorneby & Newgard, Grafton, N. D., was destroyed by fire on the 7th inst.

That Otto Lange, Hardware merchant, York, Neb., has sold out.

That G. Peppers is about to erect a Hardware store at Madison, Ill.

That McKee Bros., Hagerstown, Md., are making improvements in their Hardware store.

That Hillman, Washburn & Co., Hardware merchants, New Bedford, Mass., have removed to a new location in that place.

That A. J. Hurd of Bertrand, Neb., has sold a half interest in his Implement business to R. P. Larsons, the firm becoming Larsons & Hurd. Mr. Hurd continues the Hardware business alone.

That F. M. Swing's Hardware store at Mason City, Ill., was entered by burglars on the 5th inst. Several Revolvers were carried away.

That an unsuccessful attempt was made to rob the Hardware store of A. L. Winder & Co., Berkley, Va., on the 10th inst. The store has been burglarized twice in three weeks.

That J. P. Ford, Hardwareman, Lacona, N. Y., has commenced the erection of a new store.

That J. W. Wheeler expects to close out his Hardware business at Brockton, Mass., shortly. He is already interested in a new line, to which he desires to devote his entire time.

That a new Hardware store is about to be opened at Messina, Cal.

That Glidden & Brown, Hardware merchants, Marianna, Ark., have opened a new store.

That a new Hardware store will soon be opened at Mankato, Minn., under the management of E. C. Burdick and Joseph Watroff.

That the John B. Varick Hardware Company's new building at Manchester, N. H., will probably be ready for occupancy about December 1.

That Chas. O. Shumway of Lyons, Neb., has disposed of his stock of Hardware and Stoves to C. F. Beck.

That fire slightly damaged Henry Sawtelle's Hardware store at Leominster, Mass., on the 4th inst. The loss is fully covered by insurance.

Exports.

PER BARK "HORNET," SEPTEMBER 26, 1892, FOR PORT ELIZABETH, SOUTH AFRICA.

By Winchester Repeating Arms Company.—1 case Guns.

By Arkell & Douglas.—325 kegs Nails, 86 cases Hardware, 720 dozen Handles, 1 case Shovels, 19 cases Plow parts, 24 cases Scales, 2 cases Saws, 25 cases Hatchets, 21 cases Fruit Jars, 50 cases Cartridges.

FOR EAST LONDON.

By the Coombs, Crosby & Eddy Company.—4 crates Hoe Handles.

By Arkell & Douglas.—24 cases Hardware, 211 cases Axes and Hatchets, 13 cases Handles, 3 crates Churns, 16 packages Fruit Jars, 157 kegs Nails, 138 cases Plows and parts, 1 case Hoes, 2 cases Ladders, 2 cases Trucks, 2 cases Hardware, 1 case Shovels, 1 bundle Hose, 2 cases Platedware, 12 cases Grindstones.

FOR ALGOA BAY.

By Winchester Repeating Arms Company.—1 case Guns, 11 cases Cartridges.

PER SHIP "SEA WITCH," OCTOBER 5, 1892, FOR MELBOURNE, AUSTRALIA.

By Sherman & Lyon.—130 boxes Wringers, 10 rolls Wire Netting.

By R. W. Forbes & Son.—14 packages Hardware, 15 boxes Scales, 24 cases Wringers, 12 packages Lampware, 4 boxes Wire.

By Winchester Repeating Arms Company.—96 cases Cartridges, 1 case Primers.

By Edward Miller & Co.—22 packages Lamp Goods.

By Sargent & Co.—29 packages Hardware.

By Edward Miller & Co.—12 packages and 2 boxes Lamp Goods.

By Cleveland Axle Mfg. Company.—7 cases Axles.

By Harrisburg Handle Company.—60 cases Handles.

By Reed & Barton.—9 cases Platedware.

By Bradley & Hubbard Mfg. Company.—6 packages Lamp Goods.

By Henry Disston & Sons.—3 cases Hardware.

By R. H. Dana & Co.—62 cases Handles.

By Meriden Britannia Company.—2 boxes Silver Platedware.

By Fayette R. Plumb.—82 cases Tools.

By Park Bro. & Co.—41 packages Steel.

By Meriden Britannia Company.—3 packages Silver Platedware.

By S. Hoffnung & Co.—17 cases Tinware, 1 case Wire, 45 cases Handles.

By Alfred Field & Co.—1 case Hardware, 1 case Castings, 3 crates Wagon Jacks, 1 case Tacks, 2 cases Nails, 3 cases Hardware, 2 cases Axes, 6 cases Castings, 2 cases Castings.

By William E. Peck.—1 case Rake Handles, 1 case Sandpaper, 18 cases Tacks.

By Sherman & Lyon.—2 cases Clothes Wringers, 2 cases Tackle Blocks, 4 packages Wheelbarrows, 10 cases Bolts, 5 cases Wrenches, 2 cases Binding Wire, 9 cases Bird Cages, 3 rolls Wire Netting, 20 cases Clothes Wringers, 2 cases Hammers, 1 case Lead Pencils, 1 case Night Latches, 12 cases Scales, 2 cases Wrenches, 1 case Auger Bits, 1 case Scales, 6 cases Axes, 47 packages Lamp Goods.

By the Australasian-American Shipping Company.—3 cases Saws, 6 cases Axes.

By W. H. Crossman & Bro.—6 cases Miter Boxes, 1 case Firearms, 3 cases Traps, 10 cases Hardware, 10 cases Chalk, 14 packages Hardware, 1 case Hay Forks, 1 case Thermometers, 1 case Hay Forks, 1 case Tools, 1 case Lead Pencils, 1 package Sifters, 1 case Iron Nails, 1 case Curry Combs, 12 crates Jacks, 3 cases Lamp Goods, 1 case Cow Bells, 30 packages Hardware, 1 case Rifles and Tools, 3 packages Grindstone Fixtures, 25 cases Axes, 3 cases Cartridges and Primers, 1 case Rifles.

By McLean Bros. & Rigg.—16 cases Plows, 43 cases Lawn Mowers, 1 case Handles, 14 cases Meat Choppers, 3 cases Lanterns, 4 cases Files, 18 packages Scales, 1 package Handles, 1 case Latches, 2 cases Hinges, 1 case Re-loading Tools, 26 packages Hardware, 2 cases Rivets, 1 case Stone Forks, 2 cases Hog Ringers, 1 case Hoes, 5 cases Scales.

By Arkell & Douglas.—3 cases Plows, 4 racks Churns, 1 case Forks, 6 cases Wringers, 1 case Saws, 3 cases Traps, 3 cases Hoes, &c., 1 case Money Tills, 1 case Revolvers, 1 case Cartridges, 4 cases Carpet Sweepers, 7 cases Bolts, 1 case Pulley Blocks, 1 case Knives, 1 case Wire Mats, 4 cases Wrenches, 8 cases Choppers, 1 case Broilers, 1 case Daubers, 1 case Brushes, 2 cases Drills, 3 cases Shovels, 4 cases Guns, 3 crates Stoves, 2 cases Tinware, 1 case Ladders, 3 cases Castings, 105 cases Axes, 13 packages Lampware, 53 packages Hardware.

PER SHIP "ADAM W. SPIES," OCTOBER 6, 1892, FOR SYDNEY, N. S. W.

By Bradley & Hubbard Mfg. Company.—14 packages Lamp Goods.

By J. G. Rollins.—3 cases Axes, 1 case Chisels, 1 case Bit Braces, 1 case Locks, 1 case Locks.

By Winchester Repeating Arms Company.—9 cases Guns, 27 cases Cartridges, 1 case Primers, 1 case Tools.

By Healy & Earl.—3 cases Iron Pumps.

By W. K. Freeman.—2 cases Refrigerators, 1 case Hardware, 2 boxes Hardware, 4 cases Hardware.

By R. W. Forbes & Son.—1 box Plated Ware, 6 cases Meat Choppers, 32 packages Agricultural Implements.

By Lazarus & Rosenfeld.—120 cases Iron Castings.

By E. W. Harrison.—4 cases Emery Wheels.

By Hartley & Graham.—13 cases Metallic Cartridges, 1 case Primers, 1 case Empty Cartridge Shells, 1 case Tools.

By R. W. Cameron & Co.—1 barrel Sheaves.

By F. & J. Meyer.—2 cases Strap Blocks, 24 cases Stove Mats.

By Itley, Doubleday & Co.—7 cases Hardware, 2 cases Brushes.

By McLean Bros. & Rigg.—9 cases Stocks and Dies, 1 case Hammers, 32 cases Handles, 14 cases Agateware, 3 cases Knives, 1 case Twist Drills, 2 cases Plough Shares, 7 cases Hardware, 6 cases Bush Hooks, 4 cases Hatchets, 5 cases Files, 1 case Dog Collars, 3 cases Hatchets, 37 cases Handles.

By the F. B. Wheeler Company.—1 case Whipstocks, 20 cases Axe Handles, 1 case Brushes, 2 cases Bolts, 1 case Hardware, 1 case Nails, 5 crates Wheels.

By William E. Peck.—4 cases Road Carts, 2 barrels Glue.

By W. H. Crossman & Bro.—9 cases Plow parts, 4 cases Corn Mills, 8 packages Grain Mills, 8 cases Iron Tacks, 10 cases Iron Nails, 2 cases Cash Drawers, 38 boxes Axes, 15 cases Picks, 4 boxes Mattocks, 1 case Granite-ware, 14 packages Hardware, 1 case Hay Forks, 400 reels Barb Wire, 1 crate Handles, 10 boxes Axes, 1 case Stove Trucks, 4 cases Lamp Goods, 2 cases Hatchets, 2 cases Shovels, 10 packages Hardware, 60 boxes Hatchets, 6 boxes Axes, 4 cases Scales, 5 cases Hardware, 11 crates Handles, 2 cases Hardware, 12 cases Lanterns, 1 case Hay Forks, 4 cases Hardware, 14 boxes Hatchets, 6 boxes Axes, 1 case Iron Tacks, 4 cases Whips, 2 barrels Cow Bells.

PER STEAMSHIP "LARGO LAW," OCTOBER 6, 1892, FOR MELBOURNE, AUSTRALIA.

By W. & B. Douglas.—1 box and 2 casks Pumps.

By Edward Miller & Co.—19 packages Lamp Goods.

By W. H. Crossman & Bro.—1 case Air Rifles, 1 case Primers, 1 case Builders' Hardware, 24 Wringers.

By Atlas Tack Corporation.—42 cases Nails.

By H. W. Peabody & Co.—34 packages Hardware, 1 box Pumps, 1 case Thermometers, 3 packages Lamp Goods, 1 case Lamp Goods, 8 cases Hardware, 200 cases Tools, 6 cases Handles, 80 cases Stretchers, 20 cases Handles, 1 barrel Wire Fixtures, 22 cases Hardware, 11 cases Handles, 14 packages Hardware, 1 case Plated Ware, 85 cases Handles, 13 cases Tools.

By R. W. Forbes & Son.—4 cases Axes, 1 case Thermometers, 43 packages Hardware, 9 cases Wringers, 4 cases Forks and Rakes, 2 cases Stamped Ware, 2 cases Shovels.

By the F. B. Wheeler Company.—2 cases Axes, 3 cases Churns, 5 cases Hardware, 3 cases Bird Cages.

By W. E. Peck.—1 case Carpenters' Hardware, 3 cases Nails, 1 case Lamp Goods, 1 package Mouse Traps, 12 cases Mouse Traps, 8 cases Builders' Hardware, 2 cases Pumps and parts.

Paints and Colors.

It should be understood that the prices quoted in this column are strictly those current in the wholesale market, and that higher prices are paid for retail lots. The quality of goods frequently necessitates a considerable range of prices.

No distinctly new features have transpired in any branch of the market during the past week. Business has been somewhat slow in several departments, owing, presumably, to the Columbus celebrations, yet most reports are to the effect that the movement of the general line of Paints and Colors is all that could reasonably be expected, considering the quite lively business effected during the first half of the month. General conditions as regards base materials remain practically the same as they were a week ago, and prices for manufactured products have undergone no particular change in the absence of sharper competition than has prevailed for some time past. Taken as a whole, the autumn season movement would appear to be quite satisfactory, and the outlook is generally represented as being encouraging.

White Lead.—The movement in corrodors' product has been somewhat erratic, as also the trade in cheaper varieties of pigment, but most reports are to the effect that deliveries continue quite up to the average volume for this season of the year. Between manufacturers of quick process pure White Lead and the better class of mixtures there is sufficient competition to keep prices slightly irregular, but the fluctuations are within narrow limits, and, in the absence of any change on the part of the associated corrodors, the market retains fairly good tone. The late decline in price of Pig Lead is thus far without visible effect.

Red Lead, Litharge, &c.—The demand for glassmakers' grades is now running quite as full as it usually does at this season, and the finer qualities of both Lead and Litharge are faring about the same as they usually do at this period of the year. Orange mineral is selling to a very fair extent at practically former prices.

Zincs.—Orders to a considerable amount have been placed for the various grades of American Oxide and the market remains in good shape, since producers maintain friendly relations and adhere to the former line of prices, while Eastern firms claim to have orders sufficient to absorb their entire production during the balance of the year. In foreign brands there is a routine business of moderate proportion at former prices.

Colors, &c.—There has been a somewhat freer movement in bulk goods, more particularly Ochres and Venetian Red, but otherwise nothing new is noted, former prices prevailing all along the line, while trade conditions suggest no probable radical changes in the immediate future. Colors for painters have undergone no change, the business passing being chiefly of routine

character and at old prices. Mixed Paints have been meeting with quite satisfactory sale for the season.

Miscellaneous.—There have been no new developments in the market for Chalk, Whiting or Putty; business is momentarily slow, but at the former line of prices. Transactions in Clays generally continue to be chiefly of routine character and at old prices.

Oils and Turpentine.

The general situation remains practically the same as it was a week ago. Pressers still have to contend against high cost of raw material, and therefore maintain the advance on Lard Oil that was made last week. Together with the condition of the market for inferior greases this condition of affairs helps other lubricants more or less, and in the natural order of things should have some force in enlivening operations in Cotton Seed product. However, it does not appear that the business passing contrasts in any marked degree with what is usual at this season of the year. As a matter of fact, both home trade and export buyers appear to be partial to conservative action, and outside speculation is smaller than usual at this season.

Linseed Oil.—There has been nothing more than a routine business the past week and the general demand is slow, with little call except from the smaller dealers and consumers. Heavy buyers seem to be well stocked with Oil that was purchased prior to the last advance in prices, and, while showing less disposition to resell, they make no move that crushers can turn to advantage. Although business is thus rather slow there does not appear to be any pressure to sell on the part of either associated or independent crushers, and prices, therefore, stand precisely the same as they were last week. The market for raw material has undergone no decided change.

Cotton Seed Oils.—There have been further large purchases of crude product for direct shipment from the primary markets to Western consumers in tank cars, and some few good-sized lots of refined are understood to have been taken for future shipment to Europe. Purely local business, however, has been on a moderate scale, and at the moment buyers and sellers are considerably apart in their ideas on value where round lots of Oil may be involved. Business here has been chiefly at prices on a level with 27½¢ for prime crude and 30¢ @ 30½¢ for prime Summer Yellow.

Lard Oil.—There has been no further change in the price of prime Lard Oil. The extreme high cost of raw material forbids any reduction in quotations, and present rates serve to restrict purchasers materially. The future of the market depends almost wholly upon the outcome of the speculative deal in Lard. The low grades have been in more demand as the result of the advance in prime, and those of quality approaching prime are somewhat higher. Extra No. 1 ranges, according to quality, from 57¢ to 65¢, No. 1 from 38¢ to 40¢ and No. 2 is quoted at 35¢ @ 38¢. At the close city prime was quoted at 70¢, with very little obtainable.

Tallow Oil.—The demand for this article has increased, as a result of the advance of the advance in Lard Oil. The market is firm, prime being held at 45¢ @ 50¢, as to quantity and quality.

Fish Oils.—No new developments in any line during the past week. Sales of crude products have been moderate, chiefly at old prices, and the movement of manufactured goods has not exceeded ordinary bounds.

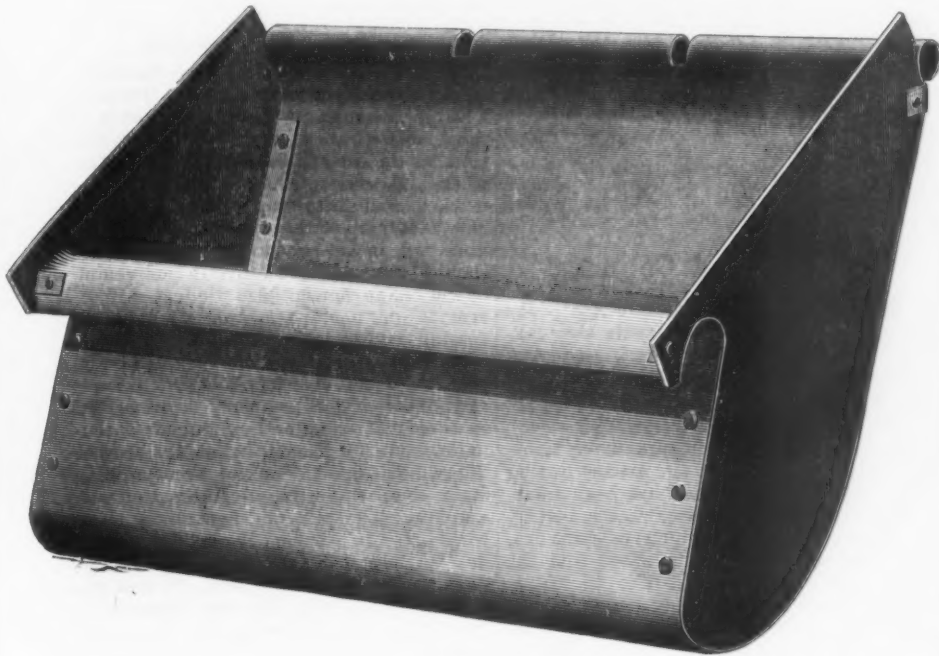
Spirits Turpentine.—Business in this commodity has been on a more liberal scale in the local market, and advices from the South report larger dealings there. Prices have advanced about 1¢ per gallon, and the market is at present looking quite strong.

Elevator Bucket.

W. J. Clark & Co., Salem, Ohio, have recently filled a second large order for Prinz & Rau, Milwaukee, Wis., for elevator buckets as represented in the accompanying cut. The buckets are made of No. 14

the article to its purpose. The handle is $3\frac{1}{2}$ inches long, with a stag covering and steel bolster. One of the features is a farrier's blade with a turned end to prevent injury in hoof cutting, together with a fleam or lancet for bleeding and a separate blade for ordinary purposes. In addition there is a hook for extracting stones

corresponding size; and that in strength it is many times superior to the ordinary sled, safely supporting half a ton weight. They state that in workmanship, mechanical appearance, good proportions and general beauty it is prominent; and that in durability it is unexcelled.

*Elevator Bucket.*

standard gauge sheet steel. Their length across the belt or carrying chains is 24 inches, with a corresponding projection and depth. At the back of the bucket a bead or roll is formed on the upper edge about an inch in diameter, through which an iron rod passes. This rod is fastened to the endless chains, operated by the usual arrangement of machinery for elevators. The bead on the front upper edge is large enough to allow the back or smaller roll of the next bucket to fit and to work easily within it, thus joining the buckets one to another, so that there is no space between them for coal or dust to fall through. The peculiar shape of the buckets and their successful operation are referred to by the makers as assuring their successful operation in handling coal without as much waste as generally attends that business.

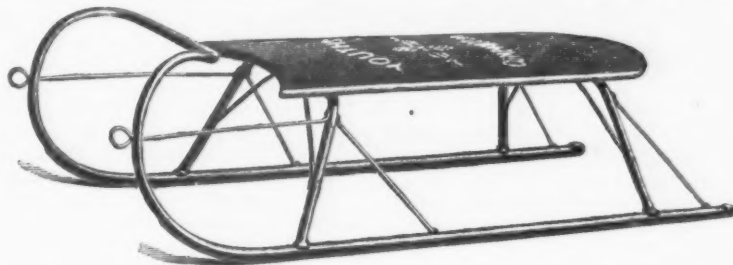
Horseman's Pocket Knife.

Among the novelties in cutlery recently noticed in the stock of J. Curley & Bro., 6 Warren street, was a pocket knife designated as the Horseman's Friend, intended for the use of a gentleman having one

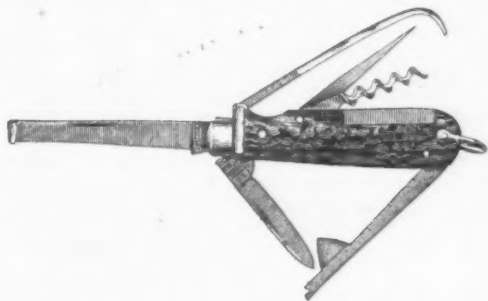
from a hoof, and a corkscrew. In addition to the features alluded to is a square, well-pointed reamer, useful in making an extra hole in a strap for a buckle tongue.

Tubular Hand Sled.

Rumsey Mfg. Company, Detroit, Mich., are introducing this sled under the name

*Tubular Hand Sled.*

of Youth's Companion, as illustrated herewith. The runners are made of a continuous piece of steel tubing, with tubular knees, securely braced. The

*Pocket Knife for Horsemen, Veterinarians, &c.*

or more horses, veterinarians, or such as require a tool of this description for miscellaneous use. The illustration of conveys a good idea of the adaptability of

manufacturers claim that although made of steel and wrought iron, its weight is less than 10 pounds, and not above the weight of the ordinary wooden sled of

Adjustable Window Flower Stand.

S. E. Covington, Bellefontaine, Ohio, is offering this stand, as illustrated here-

*Adjustable Window Flower Stand.*

with. The stand is 5 feet high, made entirely of metal, and weighs 12 pounds. It is well finished in green and gold, making

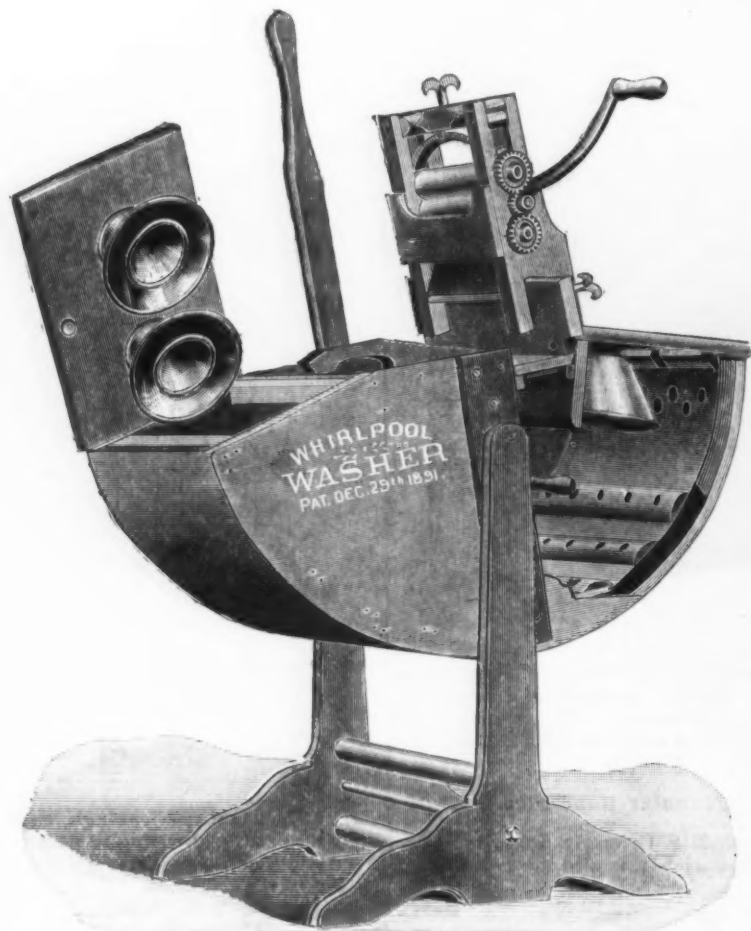
a durable and ornamental piece of furniture. It is provided with drip pan and collars which are adjustable to any point on the upright, all rests being large enough to hold 6-inch pots. The rests may be turned over the drip pan, so that the plants can be watered freely. The article is designed for a window flower stand, and is referred to as taking but a small amount of room, and as showing plants equally well from either side. The stand is placed near the window, so as to allow the projecting side of the lower pan to rest on the edge of the sill. This pan accommodates 10-inch pots. The maker suggests it may be filled with flowering plants in winter and with palms, ferns and begonias in summer.

At the Portland, Ore., recent exposition one of the notable exhibits was that of the Mitchell, Lewis & Staver Company. This consisted of carriages taken from the repository of the company, none being especially ordered for the occasion. There were carts, buggies and road wagons in

profusion; also track sulkies, including the Frazier bicycle-sulky that Nancy Hanks made such fast time in. In the line of heavy carriages were landaus, broughams, Victorias, coupés, cabriolets, &c.

The Whirlpool Washer.

The Whirlpool Mfg. Company, DuBois, Pa., are introducing this washer, as illus-

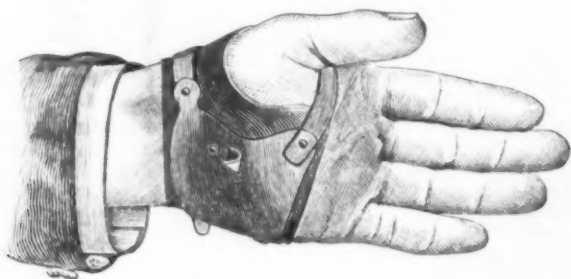


The Whirlpool Washer.

trated herewith. It is described as being so constructed that it forces the hot water and suds back and forth through the clothes by means of double-cone pounding cups at the ends of the machine and a double perforated bottom, forming an air-space under the clothes. Every motion of the washer, it is stated, turns the clothes, exposing all parts alike to the action of 40 direct streams of water, and without any possibility of injuring the most deli-

The Standard Corn Husker.

Moore & Wickert, Green Spring, Ohio, are offering this husker, as illustrated herewith. It consists of a nickel-plated steel plate shaped to fit the lower part of the hand, attached to leather having buckles and straps to secure it in position on the operator's hand. A substantial steel hook is attached to the plate, to one side of the center, as shown in the cut. In operation the ear of corn is grasped with the left



The Standard Corn Husker.

cate fabric. The makers claim that the machine does its work quickly and completely, so that no hand rubbing is required. The point is made that no boiling of the clothes is needed with this machine, but after tipping the machine ten minutes, then rinsing the clothes well, they are ready for the line.

ears from the husk. The manufacturers claim that with this husker more corn can be husked and husked with more ease; that the hand will not be made sore; that it can be used over a glove or mitten successfully, and that it leaves every joint of the hand free, and can be worn while tying fodder.

The World's Fair Roaster, Baker and Steamer.

Co-operative Mfg. Company, Rochelle, Ill., are offering this article, as illustrated herewith. It consists of an upper pan with a hand-made deep flange, which is fitted to a uniform lower pan, making it as nearly steam tight as possible. Inside the lower pan is another pan resting on a perforated rack. The roaster is designed to be used on the top of a stove or range, or when wishing to force is placed in the oven. The point is made that the inside pan being placed on the rack, whatever is cooking cannot burn in a reasonable length of time, as the direct heat cannot strike it from the top, side or bottom. It is stated that when used on the top of the stove, it works automatically, cooking evenly, leaving the meat juicy, nutritious and

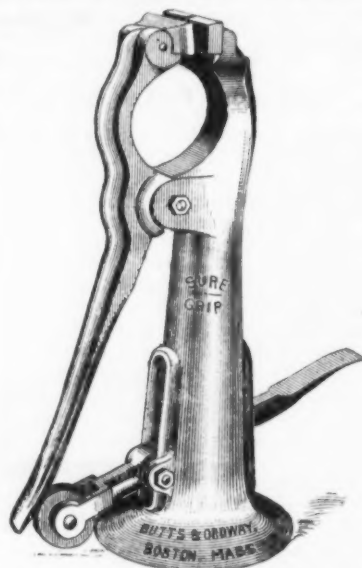


The World's Fair Roaster, Baker and Steamer.

palatable. The article is referred to by the makers as an improvement over a two-pan roaster, saving over 30 per cent. of nutriment, and as being an economical roaster of all kinds of meat, poultry, fish, and as suitable for baking bread, cake, beans, or steaming vegetables, pot-pies, puddings, apple dumplings, oat meal, cracked wheat, rice, hominy, and all kinds of fruit. A ventilator in the top of the upper pan is opened for browning meat, a short time before removing it.

Sure-Grip Adjustable-Jaw Foot Vise.

Butts & Ordway, 500 Atlantic avenue, Boston, are introducing this vise, as illus-



Sure-Grip Adjustable Jaw Foot Vise.

trated herewith. The vise, which weighs 150 pounds, stands alone and has no wood to burn. It has an adjustable back jaw and a steel front jaw, fitted for both sharp-

and dull calks, and is always ready for use. The peculiar arrangement of the dies makes them adjustable to thick and thin, tapering or straight shoes, as it does not hold them by the corners of the dies, as is the usual way. It is recommended for bending and shaping hot iron, thus dispensing with an ordinary vise. This machine, it is stated, is well made of best materials, and is sold at a low price.

Bolte Automatic Timekeeper.

The National Time-Recorder Company, 361 and 363 East Water street, Milwaukee, Wis., are introducing the timekeeper as shown in Fig. 1. In Fig. 2 a section of

proprietor enters his establishment in the morning one glance at the clock will indicate just those employees who are late or absent, and how many minutes they are behind time.

Fig. 3 shows a section of the key rack through the openings of which the registrations are made.

The registering key is shown, full size, in Fig. 4. Each workman draws his pay according to a certain number, the one shown being No. 75. This number appears in raised letters on each end of the key, the end marked "in" being nickel, the end marked "out" being of copper. The indication of an employee registering "out" is shown by a star being placed after the number, thus, 75*.

and names of those who are arriving on time, or others who are habitually late or absent.

To Keep Guns From Rusting.

A St. Louis paper suggests that the best way to preserve a gun from rusting is to have a ring of zinc soldered round the barrel, or, if it is not convenient to do this, to have a long strip of zinc soldered out of sight underneath the barrel. It is stated that the galvanic action excited between the zinc and the iron effectually prevents the oxidation of either metal, and as long as the zinc remains in contact with the iron not a particle of rust will appear on

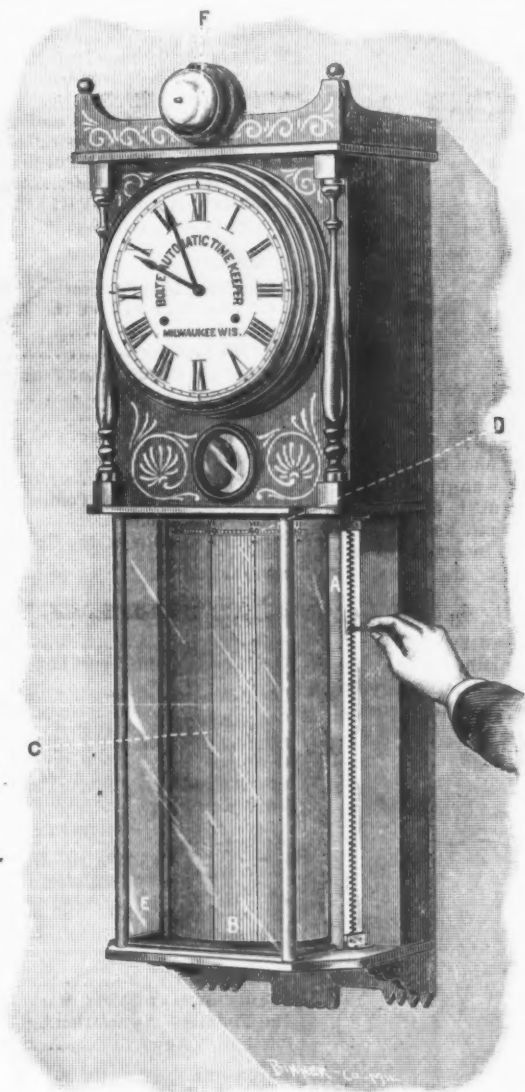


Fig. 1.—Bolte Automatic Timekeeper.

the upper part of the record sheet is seen. The cylinder around which this record sheet moves turns in time with the hour hand, making one revolution every 12 hours. The heavy line marked 7 o'clock, indicates the hour at which the workmen

The manufacturers claim for the timekeeper that each workman makes his own registration, and cannot complain of the timekeeper, and that no collusion is possible between the timekeeper and the employees.



Fig. 4.—Registering Key.

are expected to arrive. The numbers recorded on the left of this line are early, whereas those on the right are late. Each of the light-colored lines indicates five minutes, therefore any one registering three lines to the right of the 7 o'clock line would be 15 minutes late, and as the

The point is made that it has been demonstrated by actual use that employees are much less liable to be late, as by the use of this device not only the workmen themselves are able to inspect the record, but their employers are able each day at a glance to ascertain the numbers

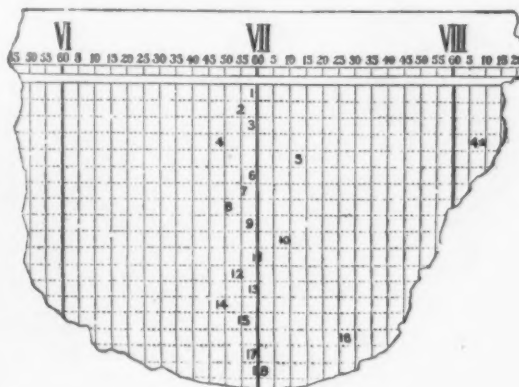


Fig. 2.—Section of Record Sheet.

either the inside or outside of the barrel. This suggestion has particular interest for sportsmen, and the simplicity of the method makes it easy to test.

The Jeffrey Mfg. Company, Columbus, Ohio, have recently put on the market new lines of detachable chain and chain belting

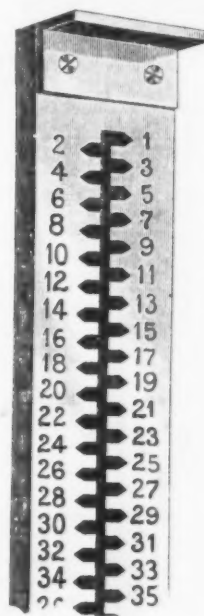


Fig. 3.—Section of Key Rack.

in various styles. Their catalogue furnishes full information regarding these goods, which will be of interest to those using or requiring appliances of this character.

An English shipbuilding firm are stamping seamless metallic lifeboats from two thin sheets of steel. Dr. Francis was the pioneer in this line of enterprise at his works in Brooklyn.

The Rochester Coffee Filter.

Rochester Stamping Works, Rochester, N. Y., are introducing a coffee filter, as illustrated in Fig. 1. The filter has a removable cloth strainer and metal sides.

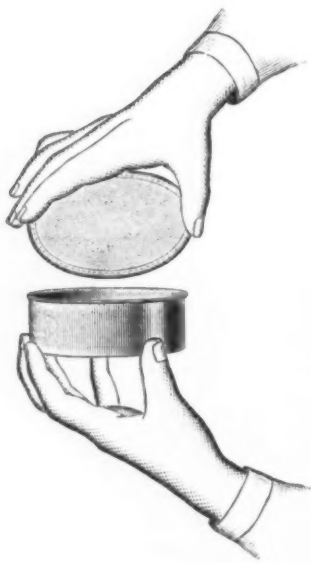


Fig. 1.—The Rochester Coffee Filter.

The operation of the filter is shown in Fig. 2. The manufacturers state that the special advantage of the filter is that the sides or upright parts are of metal, causing the water to pass directly through the coffee and thus do its full work.

The Bicycle Clipper.

Gillette Clipping Machine Company, 155 East Twenty-third street, New York,

ner as a bicycle, the driver sitting on the seat, which can be lowered or raised to suit the leg reach of a man or boy. The movements of the horse can be followed by guiding right or left with the extending arms in front of the seat. Both belts may be tightened by simply adjusting the col-

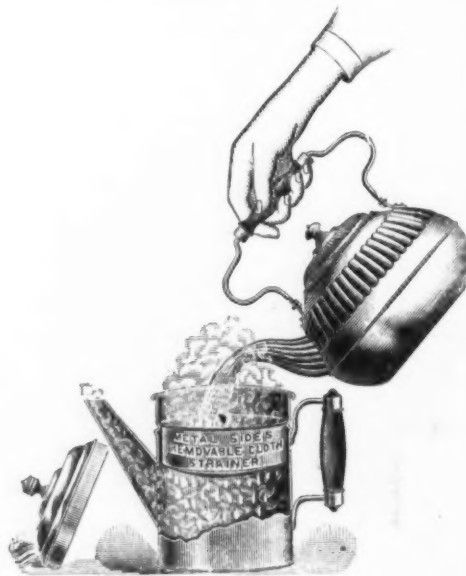
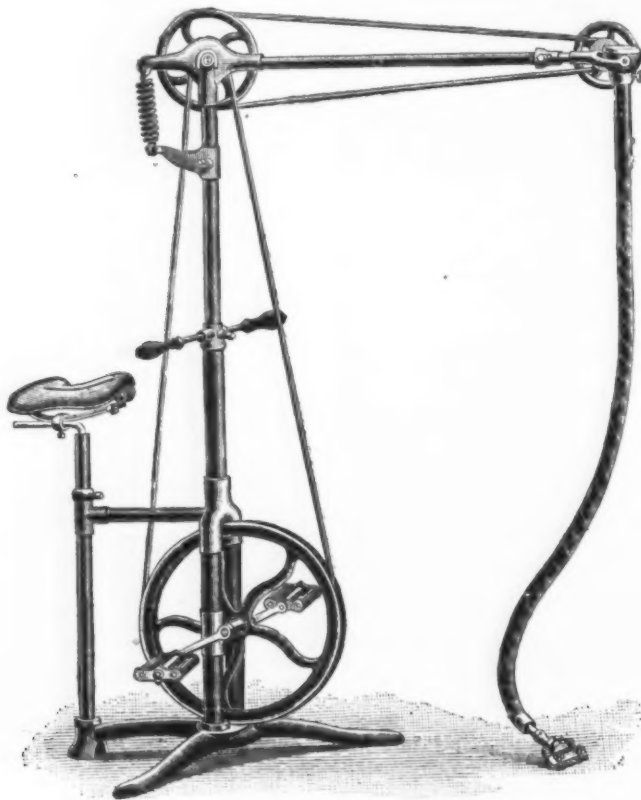


Fig. 2.—Rochester Filter in Use.

lar around the pipe. The sleeve at the lower end of the spring may be adjusted up or down to change the angle or pitch of the top arm. A prominent feature of the clipper is the flexible shaft used, which, it is stated, may be tied into a knot while running. The cutters are given 1500 strokes a minute, and, it is claimed, will clip a horse perfectly in 30 minutes—the machine having a 10-foot swing.

The manufacturers claim for the clipper that it is simple in construction, rapid in adjustment, easy of operation, accurate in



The Bicycle Clipper.

are offering a Horse Clipper, as illustrated herewith. It is operated in the same man-

workmanship, universal in all its movements, strong and compact.

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Current Hardware Prices.

OCTOBER 19, 1892.

Note.—The quotations given below represent the Current Hardware Prices which prevail in the market at large. They are not given as manufacturers' prices, and manufacturers should not be held responsible for them. In cases where goods are quoted at lower figures than the manufacturers name, it is not stated that the manufacturers are selling at the prices quoted, but simply that the goods are being sold, perhaps by the manufacturers, perhaps by the jobbers at the figures named.

The character @ is used to indicate a range of price; thus discount 50&10@50&10&5% signifies that the goods in question are sold at prices ranging from discount 50 and 10 % to discount 50 and 10 and 5 %.

Adjusters, Blind—

Domestic..... 1/2 doz \$3.00, 33 1/2 %
Excelstor..... 1/2 doz \$10.00, 50&10&5 %
North's..... 1/2 doz \$10.00, 50&10&5 %
Zimmerman's—See Fasteners Blind.

Ammunition—See Caps, Cartridges, Shells, &c

Anvils—

Eagle Anvil, 1/2 doz..... 15&15 1/2 %
Peter Wright's..... 11&11 1/2 %
Armstrong's Mouse Hole..... 10&10 1/2 %
Am. Wrought, Horse shoe brand, 11&11 1/2 %
Trenton..... 10&10 1/2 %
Wilkinson's..... 10&10 1/2 %
Moore & Barnes Mfg. Co..... 33 1/2 %

Anvil Vise and Drill—

Millers Falls Co., \$18.00..... 20 %
Cheney Anvil and Vise..... 25 %
Allen Anvil and Vise, \$3.00..... 40&10 %
Star..... 45&5 %

Apple Parers—See Parers, Apple, &c.

Augers and Bits—

Douglas Mfg. Co..... 75 %
Wm. A. Ives & Co..... 75 %
Humphreysville Mfg. Co..... 75 %
French, Swift & Co. (F. H. Beecher)..... 75 %
P. S. & W. Co..... 75 %
Rockford Bit Company..... 55 %
Cook's, Douglas Mfg. Co..... 55 %
Cook's, N. H. Copper Co..... 55 %
Ives' Circular Lip..... 30 %
Patent Solid Head..... 30 %
C. E. Jennings & Co., No. 10, extension lip..... 40 %
C. E. Jennings & Co., No. 30..... 40 %
C. E. Jennings & Co., Auger Bits, 1/2 set, 32 1/2 quaters, No. 5, 3; No. 30, \$3.50, 20 %
Lewis' Patent Single twist..... 45 %
Russell Jennings' Augers and Bits..... 35 %
Imitation Jennings' Bits..... 30 %
Pugh's Black..... 20 %
Pugh's Jennings Pattern..... 30 %
Car Bits..... 60&60 1/2 %
Car Bits, P. S. & W. Co..... 60&60 1/2 %
Snell's Car Bits..... 15&15 1/2 %
L'Hommedieu Car Bits..... 15&15 1/2 %
Forstner Pat. Auger Bits..... 20 %
Cincinnati Bell-Hangers' Bits..... 30&10 %

Bit Stock Drills—

Morse Twist Drills..... 50&10&5 %
Standard..... 50&10&5 %
Cleveland..... 50&10&5 %
Syracuse, for metal..... 50&10 %
Syracuse, for wood (wood list), 30&30&5 %
Cincinnati, for wood..... 30&10 %
Cincinnati, for metal..... 45&10 %

Expansive Bits—

Clark's small, \$18, large, 35..... 35&35 1/2 %
Ives' No. 1, 1/2 doz, \$30..... 40 %
Swan's..... 40 %
Stearns, No. 1, \$20; No. 2, \$22..... 35 %
Stearns' No. 2, \$18..... 20 %

Gimlet Bits—

Common..... 1/2 gross \$2.75&\$3.25
Diamond..... 1/2 doz \$1.25..... 10&10 1/2 %
Bee..... 25&25 1/2 %
Double Cut, Shepardson's..... 45&45 1/2 %
Double Cut, Ct. Valley Mfg. Co..... 30&10 %
Double Cut, Hartwell's, 1/2 gross..... 45&25 %
Double Cut, Douglas's..... 40&10 %
Double Cut, Ives..... 60&60 1/2 %

Hollow Augers—

Ives'..... 33 1/2 %
French, Swift & Co..... 33 1/2 %
Douglas'..... 10 %
Bonney's Adjustable, 1/2 doz \$18..... 40&10 %
Stearns'..... 30&10 %
Ives' Expansive, each \$4.50..... 50&5 %
Universal Expansive, each \$4.50..... 30 %
Wood's..... 25&25 1/2 %
Cincinnati Adjustable..... 25&10 %
Cincinnati Standard..... 25&10 %

Ship Augers and Bits—

L'Hommedieu's..... 15&10&15 1/2 %
Watrous'..... 15&10&15 1/2 %
Snell's..... 15&10&15 1/2 %
Snell's Ship Auger Pat'n Car Bits, 15&10&15 1/2 %

Awl Hafts—See Hafts, Awl.

Awls—

Awl, Sewing, Common..... 1/2 gr. 85¢@90¢
Awl, Should. Peg..... 1/2 gr. \$1.50&\$1.55
Awl, Pat. Peg..... 1/2 gr. 35¢@38¢
Awl, Shouldered Brad..... 1/2 gr. \$1.30&1.40
Awl, Handled Brad..... 1/2 gr. \$2.50&\$3.00
Awl, Handled Scratch..... 1/2 gr. \$4.00&\$4.50
Awl, Socket Scratch..... 1/2 doz. \$1.10&\$1.20

Awl and Tool Sets—See Sets, Awl and Tool.

Axes—

First quality, best brands, 7/16..... \$7.50
First qual., other brands..... 6.50 @ 7.00
Second quality..... 5.50 @ 6.00

Axle Grease—See Grease, Axle.

Axles—

No. 1..... 3 1/4 @ 4 1/4, No. 2, 5 @ 6
Nos. 7 to 14..... 60&10 %
Nos. 15 to 18..... 47 1/2 %
Nos. 19 to 22..... 70 %
Concord Axle, loose collar..... 4 1/4 @ 4 1/2
Concord Axle, solid collar..... 4 1/4 @ 4 1/2
National Tubular Self Oiling..... 3 1/4 @ 3 1/2

Bag Holders—See Holders, Bag.

Balances—

Spring Balances..... 40 %
No. 3000 20 30
Chatillon, 1/2 doz..... \$0.80, 0.95 1.75 net
Chatillon Straight Balances..... 40 %
Chatillon Circular Balances..... 50&10 %

Barb Wire—See Wire, Barb.

Bars—

Crow..... 1/2 doz 3 1/4
Iron, Steel Points..... 1/2 doz 3 1/4

Basins, Wash—

Standard Fiberglass, No. 1, 10 1/2 inch, \$2; 12 inch, \$2.25 13 1/2 inch, \$2.75; 15 inch, \$3.25.

Beams, Scale—

Scale Beams, List Jan. 12, '82, 50&10&5 %
Chatillon's No. 1..... 40 %
Chatillon's No. 2..... 50 %
Custer's..... 33 1/2 %

Beaters—

Egg—

Dover..... 1/2 doz \$1.20&\$1.50
Duplex (Standard Co.)..... 1/2 doz \$1.25
Rival (Standard Co.)..... 1/2 doz \$1.00
Duplex Extra Heavy (Standard Co.)..... 1/2 doz \$1.00
Bryant's..... 1/2 gross \$14.00
Double (H. & R. Mfg. Co.), 1/2 gross, No. 0 \$12.00; No. 1, \$15.00; No. 2, \$20.00
Easy (H. & R. Mfg. Co.)..... 1/2 gross \$12.00
Triple (H. & R. Mfg. Co.)..... 1/2 gross \$16.50
Spiral..... 1/2 gross \$4.25 @ \$4.50
Improved Acme (H. & R. Mfg. Co.)..... 1/2 gross \$9.00
Paine, Diehl & Co.'s..... 1/2 gross \$24.00
Silver & Co..... 1/2 doz \$5.50

Culinary—

Keystone, P. D. & Co., Each, No. 1, \$1; No. 2, \$2..... 20 %

Bells—

Cow—

Common Wrought..... 60&10 %
Western, Sargent's list..... 70&10 %
Kentucky, "Star"..... 20&10 %
Kentucky, Sargent's list..... 70&10 %
Kentucky, Durham..... 70&10 %
Edge, Genuine Kentucky..... 70&10 %
Texas Star..... 50&10 %

Door—

Gong, Abbe's..... 33 1/2 %
Gong, Yankee..... 45&10 %
Gong, Barton's..... 40&10&50 %
Crane, Taylor's..... 25&10 %
Crane, Brooks'..... 50&10&2 %
Crane, Cone's..... 10 %
Crane, Connel's..... 20&10 %
Lever, Sargent's..... 50&10 %
Lever, Taylor's Bronzed or Plated..... net
Lever, Taylor's Japanned..... 25&10 %
Lever, R. & E. Mfg. Co.'s..... 50&10&2 %
Lever, Brook's..... 50&10&2 %

Electric—

Wollensak's..... 20 %
Bigelow & Dowse..... 20 %
Taylor's..... 20 %

Hand—

Light Brass..... 70&10 %
Extra Heavy..... 70 %
White..... 70 %
Silver Chime..... 33 1/2 %
Globe Cone's Patent..... 25&10&35 %

Miscellaneous

Call..... 40 @ 40&5 %
Farm Bells..... 1/2 doz \$3.50
Steel Alloy Church and School Bells..... 40 %

Bellows—

Blacksmiths'..... 60&10&60 1/2 %
Molders'..... 40&10&50 %
Hand Bellows..... 40&10&50 %

Belt, Rubber—

Common Standard..... 70&10&75&5 %
Standard..... 70&5&70&10 %
Extra..... 60&10&60 1/2 %
N.Y.B. & P. Co., Carbon..... 60 %
N.Y.B. & P. Co., Diamond..... 60 %
N.Y.B. & P. Co., Para..... 40 %

Bench Stops—See Stops, Bench

Benders and Upsetters, Tire—

Stoddard's Lightning Tire Upsetters..... 15 %
Detroit Perfected Tire Bender..... 15 %
Green River Tire Benders and Upsetters..... 20 %

Bits

Auger, Gimlet, Bit Stock Drills, &c., see Augers and Bits.

Bit Holders—See Holders.

Blind Adjusters—See Adjusters, Blind.

Blind Fasteners—See Fasteners, Blind.

Blind Staples—See Staples, Blind.

Blocks—

Cleveland Block Co., Mal. Iron, 50&50&10 %
Moore's Novelty, Mal. Iron..... 50 %
Sure Grip Steel Tackle Blocks..... 25 %

Bolts—

Carriage, Machine, &c.—

Com. list June 10, '84..... 75&10&5&2 %
Genuine Eagle, Norway, list Oct. '84..... 80&50&10 %
Phila. pattern, list Oct. 7, '84..... 75&10&80 %
R.B. & W., old list..... 70 %
Machine, list Jan. 1, 1890..... 80&80&5 %
Bolt Ends, list Jan. 1, 1890..... 75&10&75&10&5 %

Door and Shutter—

Cast Iron Barrel, Square, &c..... 70&10 %
Cast Iron Shutter Bolts..... 70&10 %
Cast Iron Chain (Sargent's list)..... 65&10 %
Ives' Patent Door Bolts..... 60&10&60 1/2 %
Wrought Barrel..... 70&70&10 %
Wrought Square..... 70&70&10 %
Wrt Shutter, all Iron, Stanley's..... 40&10 %
Wrt Shutter, Brass Knob..... 40&10 %
Wrt Shutter, Sargent's list..... 60&10 %
Wrt Sunk Flush, Sargent's list..... 55&10 %
Wrt Sunk Flush, Stanley's list..... 50&10 %
Wrt B. K. Flush, Co' mr..... 55&10 %

Stove and Plow—

Stove..... 60&60&10 %
Plow..... 60&60 %
R. B. & W., Plow..... 55 %

Tire—

Common, list Feb. 28, '83..... 65&45&5 %
Port Chester Bolt and Nut Company..... 65 %
Empire list Feb. 28, '83..... 65 %
Keystone, Philadel., list Oct. '84..... 80 %
Norway, Phila., list Oct. '84..... 75 %
Norway, Phila., list Oct. 16, '84..... 75 %
Eagle, Phila., list Oct. 16, '84..... 80 %
Phila., list Oct. 16, '84..... 80 %
Ray State, list Feb. 28, '83..... 65 %
R. B. & W., Philadel., list Oct. 16, '84..... 80 %

Borers, Tap—

Common and Ring..... 20&10 %
Ives' Tap Bore..... 33 1/2 %
Enterprise Mfg. Co..... 20&10&30 %
Clark's..... 33 1/2 %

Borax—

Per lb..... 94¢@10 1/2 %

Boring Machines—See Machines, Boring.

Bow Pins—See Pins, Bow.

Boxes, Wagon—

Per lb..... 23 1/2 %

Braces—

American Bit Brace Co..... 80&10 %
Nos. 11, 21, 24, 27..... 70&10 %
Nos. 22, 23, 25..... 60&10&5 %
Nos. 13, 23, 36, 37..... 70&10 %
Ball Braces, net..... \$1.12 to \$1.25
Amidon's..... 75&10&80 %
Barker's Imp'd Plain..... 65&10&70 %
Barker's Imp. Nickeled..... 75&10&80 %
Ratchet..... 60 %
Globe Jawed..... 40&40&10 %
Corner Brace..... 40&40&10 %
Universal, 8 in., \$2.10; 10 in., \$2.25
Buffalo Ball..... \$1.10&\$1.15
Barber's..... 50&50&10 %
Nos. 10 to 16..... 50&50&10 %
Nos. 30 to 33..... 50&50&10 %
Nos. 40 to 63..... 50&10&50&10&5 %
Saxton's..... 75&10&80 %
Barker's Imp. Polished..... 65&10&70 %
Barker's Imp. Nickeled..... 50&10&60 %
Ratchet, Polished..... 40&10&50 %
Ratchet, Nickeled..... 40&10&50 %
net, \$1.10&\$1.15
Bartholomew's..... 50&10&60&5 %
Nos. 25, 27 and 30..... 70&70&5 %
Nos. 117, 118, 119..... 70&70&5 %
Common Ball, American..... \$1.00&\$1.10
Fray's Genuine Spofford..... 50&50&50&10 %
Fray's Nos. 70 to 120, 81 to 123, 207 to 414..... 50&50&50&10 %
Ives' New Haven Novelty..... 70&70&5 %
New Haven Ratchet..... 60&50&60&10 %
Barber Ratchet..... 60&50&60&10 %
Barber's..... 60&5 %
Spofford..... 60&50&60&10 %
Osgood's Ratchet..... 40&10&50 %
P. S. & W. Co., Peck's Patent..... 60 %

Brackets—

Shelf, plain..... 85¢@70 %
Sargent's list..... 60¢@60¢@10 %
Shelf, fancy..... 60¢@60¢@10 %
Sargent's list..... 60¢@60¢@10 %
Other makes at a wide range of prices.

Bright Wire Goods—See Wire.

Broilers—

Hens' Self-Inch..... 9 10 9x11
Basting, 1/2 Per doz..... \$4.50 5.50 6.50
New Haven..... 50 %
Wire Goods Co..... 65&10 %
Morgan Odorous..... 1/2 doz. \$12, 33 1/2 %

Buckets, Well—

Galvanized—

Hill's..... 1/2 doz. 12 qt. \$4.25; 14 qt. \$5.25
Iron Clad..... 1/2 doz. 14 qt. \$4.25&4.50
Helwig's Flat Iron Band..... \$3.75
Helwig's Wired Top..... 1/2 doz \$4.00

Bull Rings—See Rings, Bull.

Butcher's Cleavers—See Cleavers, Butcher's.

Butts—

Brass—

Wrought Brass..... 80&80&10 %
Cast Brass, Tiebout's..... 50 %
Cast Brass, Fast..... 33 1/2 %
Cast Brass, Loose Joint..... 33 1/2 %

Cast Iron—

Fast Joint, Narrow..... 50&10&50&60 %
Fast Joint, Broad..... 50&10&60 %
Loose Joint..... 75&75 %
Loose Joint, Japanned..... 810 %
Loose Joint, Jap. with Acorns..... 75&75 %
Parliament Butts..... 810 %
Mayer's Hinges..... 75&75 %
Loose Pin, Acorns..... 75&75 %
Loose Pin, Acorns, Japanned..... 75&75 %
Loose Pin, Acorns, Japanned, Plated Tips..... 50&50&10 %

Wrought Steel—

Fast Joint, Narrow..... 75&75 %
Fast Joint, Broad..... 810 %
Loose Joint, Broad..... 75&75 %
Table Butts, Back Flaps, &c..... 810 %
Inside Blind, Regular..... 810 %
Inside Blind, Light..... 810 %
Loose Pin..... 50&50&10 %
Bronzed Wrought Butts..... 50&50&10 %

Calipers—See Compasses.

Calks, Toe—

Gautier, One Prong, Blunt..... 54¢@6¢
Burke's One Prong, Blunt..... 54¢@6¢
Burke's Two Prong, Blunt..... 74¢@8¢
Burke's One Prong, Sharp..... 64¢@7¢

Can Openers—See Openers, Can.

Caps—

Percussion—

Hicks & Goldmark's and Union Metallic Cartridge Co..... 100 %
F. L. Waterproof, 1-10's..... 35¢@37¢
E. B. Trimmed Edge, 1-10's..... 47¢@50¢
E. B. Grind. Edge, Cent. Fire, 1-10's..... 47¢@50¢
Musket, Waterproof, 1-10's..... 47¢@50¢
G. D..... 27¢@30¢
S. B. Genuine Imported..... 36¢@38¢
Eley's E. B..... 36¢@38¢
Eley's D Waterproof, Central Fire..... \$1.60

Primers—

Berdan Primers, \$1.00..... 2 %
B. L. Caps (for Sturtevant Shells) \$1.00..... 2 %

All other Primers, \$1.20..... 2 %

Cards—

Watson's Cotton, Wool, Horse and File, list January 28, 1891..... 25 %

Carpet Stretchers—

See Stretchers, Carpet.

Carpet Sweepers—

See Sweepers, Carpet.

Cartridges—

Rim Fire Cartridges..... 50&5&2 %
Rim Fire Military..... 15&2 %
Cent. Fire, Pistol and Rifle..... 25&2&2 %
Cent. Fire, Military and Sporting..... 15&2 %
Blank Cartridges, except 22 and 32 cal., additional 10 % on above discounts.
Blank Cartridges, 22 cal., \$1.75..... 2 %
Blank Cartridges, 32 cal., \$3.50..... 2 %
Primed Shells and Bullets..... 15&2 %
B. B. Caps, Round Ball, \$1.75..... 2 %
B. B. Caps, Con. Ball, Swgd., \$2.00..... 2 %

Casters—

Bed..... 55¢@55&10 %
Plate..... 60¢@60&10 %
Shallow Socket..... 40&10 %
Deep Socket..... 45 %
Yale, Gem..... 45 %
Martin's Patent (Phoenix), 45&10&50&10 %
Payson's Anti-friction..... 70 %
Payson's Truck..... 80 %
Giant Truck Casters..... 30 %
Stationary Truck Casters..... 50&10 %
Socket Truck Casters..... 50 %
Gwinner's Common Sense..... 50 %
Gwinner's Hercules..... 50 %

Cattle Leaders—

See Leaders, Cattle.

Cement—

Victor Elastic..... 5 lb pails 1/2 lb 5¢

Chain—

Trace, Wagon and Fancy Chains, list revised Oct. 15, 1892..... 60¢@60&10 %
American Coil, in cask lots..... 3-16 3/4 5-16 3/4 7-16 3/4 9-16 3/4
\$7.60 5.30 4.45 3.40 3.65 3.50 3.40 3.25
Less than cask lots, add 10¢@15¢
German Collar Patent (Phoenix), 45&10&50&10 %
German Halter Chain, list July 12, 1892..... 60¢@60&5 %
Covert Halter..... 60&2 %
Covert

Chalk Lines—See Lines.**Chisels—****Socket Framing and Firmer**

P. S. & W.	
New Haven	
Wetherby	
Mit.	
Ohio Tool Co.	
Douglas	.75@75&10&5%
Buck Bros.	.30
Merrill	.60&10@60&10&5%
L. & I. J. White	.30@30&5%

Tanged and Miscellaneous.

Tanged Firmers	.40@10&50%
Butchers	\$4.75@5.00
Spear & Jackson's	.50 to 2
Buck Bros.	.30
Cold Chisels, P. S.	.15@10%

Chucks—

Beach Pat.	each, \$8.00	.20%
Morse's Adjustable	each, \$7.00, 20@20&5%	
Danbury	each, \$6.00, 30@30&5%	
Syracuse, Balz Pat.		.25%
Graham Patent		.33%
Skinner's Patent Chucks		.33%
Combination Lathe Chucks		.33%
Universal Lathe Chucks		.40%
Independent Lathe Chucks		.40%
Drill Chucks		.15%
Union Mfg. Co.		
Victor	\$8.50, 25%	
Combination		.40%
Universal		.40%
Independent		.40%

Churns—

Tiffin Union	each, 5 gal. \$3.25; 7 gal. \$3.75; 10 gal. \$4.25
McDermald Star Barrel Churn	each 6 gal. \$2.00; 10 gal. \$2.75; 15 gal. \$3.00; 20 gal. \$3.25

Clamps—

R. I. Tool Co.'s Wrought Iron	.25%
Adjustable, Cincinnati	.15&15&5%
Adjustable, Hammer	.30@30&10%
Adjustable, Stearns	.30@30&10%
Stearns' Adjustable Cabinet and Corner	.30@30&10%
Cabinet, Sargent's	.60&10%
Carriage Makers', Sargent's	.70&10%
Carriage Makers', P. S. & W. Co.	.40&10%
Eberhard Mfg. Co.	.40&5&40&10%
Warner's	.40&10&40&10&5%
Saw Clamps, see Vises, Saw Filers	
Carpenter's, Cincinnati	.25&10%

Cleavers, Butchers'—

Bradley	.25@30%
L. & I. J. White	.25&10%
Beatty's	.40&40&5%
New Haven Edge Tool Co.	.40%
P. S. & W.	.30&5&30&10%
Foster Bros.	.30%
Schulte, Lohoff & Co.	.40@40&5%

Clips—

Norway Axle, 1/4 & 5-16	.55&5&5%
2d grade Norway Axle, 1/4 & 5-16	.65&5%
Superior Axle Clips	.60&5&70%
Norway Spring Bar Clips, 5-16	.60&5&5%
Wrought Iron Felloe Clips	P. S. 5¢
Steel Felloe Clips	P. S. 5¢
Baker Axle Clips	.25%

Cloth and Netting, Wire—

—See Wire, etc.

Cockeyes**Cocks, Brass—**

Hardware list	.60&2%
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Coffee Mills—See Mills, Coffee.**Collars, Dog—**

Chapman Mfg. Company	.50&10&40%
Medford Fancy Goods Co.	.40&10&50%
Embossed, Gift, Pope & Steven's list	.30&10%

Combs, Curry—

Fitch's	.50&10@50&10&10%
Rubber, per doz.	\$10.00
American Curry Comb Co.	.33&10%

Compasses, Dividers, &c.

Compasses, Callipers, Dividers, 70@70&10%	
Bemis & Call Co.'s	.60&5%
Dividers	.50&5%
Compasses and Callipers	.50&5%
Wing and Inside or Outside	.50&5%
Double	.60%
Call's Patent Inside	.30%
Excelsior	.50%
J. Stevens & Co.'s	.25&10%
Starrett's	
Spring Callipers and Dividers	.25&10%
Lock Callipers and Dividers	.25%
Combination Dividers	.25%

Coopers' Tools—

—See Tools, Coopers'.

Cord—

Common	Sash—	P. S. 10@11¢
Patent, good quality	P. S. 12@12¢	
White Cotton Braided, fair	P. S. 24¢@25¢	
Common Russia Sash	P. S. 12¢@13¢	
Patent Russia Sash	P. S. 14¢	
Cable Laid Italian Sash	P. S. 21¢@22¢	
India Cable Laid Sash	P. S. 12¢	
Silver Lake		
A quality, White, 50'	.25%	
A quality, Drab, 55'	.25%	
B quality, White, 30'	.10%	
B quality, Drab, 35'	.10%	
Sylvan Spring, Extra Braided, White	.34¢	
Sylvan Spring, Extra Braided, Drab	.30¢	
Semper Idem, Braided, White	.27¢@28¢	
Egyptian, India Hemp, Braided	.26¢	
Massachusetts, White	.26¢	
Samson—		
Braided, White Cotton, 50'	.30@30&5%	
Braided, Drab Cotton, 55'	.30@30&5%	
Braided, Italian Hemp, 55'	.30@30&5%	
Braided, Linen, 80'	.30@30&5%	
Tate's Cotton Braided, White, P. S.	.28¢, 10%	
Ossawa Mills—		
Braided, Giant, White, P. S.	.30¢	
Braided, Giant, Drab and Fancy	.30¢	
Braided, Crown, White, P. S.	.50¢	
Braided, Crown, Drab and Fancy, P. S.	.50¢	

Wire Picture—

Braided or Twisted...80@80&15%

Corkscrews—See Screws, Cork.

Corn Knives and Cutters

—See Knives, Corn.

Crackers, Nut—

Table (H. & B. Mfg. Co.)	.40%
Blake's Pattern, P. doz.	\$2.00
Turner & Seymour Mfg. Co.	.50%
Acme, P. gross	.50
Japanese	.50%
Nickel Plated	.10%

Cradles—

Grain	.50&5&2@50&10&2%
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Crayons—

White Crayons, P. gross	.10¢
D. M. Stewart Mfg. Co., Metal Work	.25%
cray. P. gross, \$2.50	
D. M. Stewart Mfg. Co., Rolling Mill	.25%
P. gross, \$2.50	
See also Chalk.	

Crow Bars—See Bars, Crow.**Curry Combs—**

—See Combs, Curry.

Curtain Pins—

—See Pins, Curtain.

Cutters—**Meat—**

Dixon's, P. doz.	.40&5%
Nos. 1 2 3 4	
\$14.00 \$17.00 \$19.00 \$30.00	
Woodruff's, P. doz.	.40&5%
Nos. 100 150	
\$15.00 \$18.00	
Hale's Pattern, P. doz.	.70@70&5%
Nos. 11 12 13	
\$27.00 \$33.00 \$45.00	
American	.30%
Nos. 1 2 3 4 5	
\$5 \$7 \$10 \$25 \$50 \$80	
Enterprise	.30%
Nos. 10 12 22 32 42	
Each. \$3 \$2.50 \$4 \$6 \$15	
Great American Meat Cutter	.30@30&5%
Nos. 112 116 118 120 122	
Each. \$2.00 \$2.75 \$3.00 \$3.50 \$4.00	
Miles' Challenge, P. doz.	.45@45&10%
Nos. 1 2 3	
\$22.00 \$30.00 \$40.00	
Home No. 1, P. doz.	.55&10%
Draw Cut, each:	
Nos. 5 6 8	
\$50 \$75 \$80 \$225	
.20@25%	
Beef Shavers (Enterprise)	.30&10&30%
Little Giant (P. S. & W. Co.)	.50%
Chadborn's Smoked Beef Cutter, P. doz.	.60&00

Tobacco

Champion	.20&10&30%
All Iron	.12&25
Nashua Lock Co.'s, P. doz.	\$18.00, 50&55%
Wilson's	.50
Sargent's, P. doz.	\$24.00, 50&10
Acme	.P. doz., \$20.00, 40%

Washer—

Smith's Pat.	P. doz., \$12.00, 30&10&10%
Johnson's	P. doz., \$11.00, 35&40%
Penny's, P. doz., Pol. \$14; Jap'd, \$16, 55%	
Appleton's	P. doz., \$16.00, 60&10%
Bonney's	.30&10%
Cincinnati	.25&10%

Dampers, &c.—

Dampers, Buffalo	.40&10%
Buffalo Damper Clips	.40&10%
Crown Damper	.40%
Excelsior	.40&10%

Diggers, Post Hole, &c.—

Samson post Hole Digger, P. doz.	\$36.00
Fletcher Post Hole Augers, P. doz.	\$36.00
Eureka Diggers	P. doz., \$11.50@12.50
Lead's	P. doz., \$8.00@9.00
Vaughan's Post Hole Auger	\$8.50@9.50
Kohler's Little Giant	P. doz., \$18.00
Kohler's Hercules	P. doz., \$18.00
Kohler's New Champion	P. doz., \$9.00
Schneider	P. doz., \$18.00
Ryan's Post Hole Diggers	P. doz., \$24.00
Cron's Post Bars, P. doz.	\$30.00
Gibb's Post Hole Digger	P. doz., \$15.00
Imperial	P. doz., \$15.00
Shimer's Hollow Handle	P. doz., \$24.00

Dividers—See Compasses.**Dog Collars—See Collars, Dog.****Door Springs—**

—See Springs, Door.

Drawers.

Money, P. doz.	\$18@20
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Drawing Knives—

—See Knives, Drawing.

Drills and Drill Stocks—

Blacksmiths'	each \$1.75
Blacksmiths' Self-Feeding	each \$7.50, 20%
Preast, P. S. & W.	.40&10%
Breast, Wilson's	.30&5%
Breast, Millers Falls	each \$3.00, 25%
Breast, Bartholomew's	each \$2.50
Ratchet, Merrill's	.25&10@40%
Ratchet, Ingersoll's	.25%
Ratchet, Parker's	.20@20&5%
Ratchet, Whitney's	.20&10%
Ratchet, Weston's	.20&25%
Ratchet, Moore's Triple Action	.25@30%
Ratchet, Curtis & Curtis	.30%
Whitneys Hand Drill, Plain	\$11.00
Adjustable	\$12.00
Wilson's Drill Stocks	.10%
Automatic Boring Tools	\$1.75@1.85
Chicopee Automatic Drill	.20&10%

Twist Drills—

Cleveland	.50&10&5%
Diamond, W. & B.	.50&10&5%
Graham's Pat. Groove Shank	.50&10&5%
Morse	.50&10&5%
New Process	.50&10&5%
Standard	.50&10&5%
Syracuse (Meta list)	.40%

Drill Bits or Bit Stock

—See Augers and Bits.

Drill Chucks—See Chucks.**Dripping Pans—**

—See Pans, Dripping.

Drivers, Screw—

Douglas Mfg. Co.	.20@20&10%
Disston's	.50%
Buck Bros.	.30%
Stanley R. & L. Co.'s	
No. 64, Varnished Handles	.65&10%
No. 80	.70&10%
Sargent & Co.'s	
No. 1, Forged Blade	.60&10&10%
Nos. 20, 40 and 60	.60&10&10%
P. S. & W.	.70%
Knapp & Cowley	
No. 1	.60&20@70%
No. 2	.60&10&10@70&5%
No. 3	.60&5&60&10%
Nos. 4 and 60, Acme and Ideal	.50&5&60
Stearns'	.25&10&5%
Gay & Parsons	.25%
Champion	.25&10%
Clark's Pat.	.30@33&5%
Crawford's Adjustable	.30%
Ellrich's Socket and Ratchet	.25@25&10%
Allard's Spiral, new list	.20%
Kolb's Common Sense	P. doz., \$6.00
Syracuse Screw-Drive Bits	.30&30&5%
Screw Driver Bits	P. doz., 50¢@75¢
Screw Driver Bits, Parr's	P. gross, \$8.25
Fray's Hol. H'dle Sets	No. 3, \$12.00, 45%
P. S. & W.'s All Steel	.25&10%
Cincinnati	.25&10%
Brace Screw Drivers	.25&10%
Buck Bros.' Screw Driver Bits	.27&8&5%
Goodell's Automatic	.50%
Mayhew's Black Handle	.70%
Mayhew's Monarch	.45&10%

Egg Beaters—See Beaters, Egg.**Egg Poachers—**

—See Poachers, Egg.

Electric Bell Sets—

—See Bells, Electric.

Emery—No. 4 to No. 54 to Flour, CF.

Kegs, P. doz.	46 gr. 150 gr. F.F.F.
1/2 kegs, P. doz.	4 1/2 5 2 1/2
1/4 kegs, P. doz.	4 1/2 5 2 1/2
10 lb. cans, 10 lb. cans, less	6 0 1/2 5 5
than 10...	10 10 7 1/2

Enameled and Tinned Ware—See Ware, Hollow.**Escutcheon Pins—**

—See Pins, Escutcheon.

Escutcheons—

Door Lock	Same dis. as Door Locks.
Brass Thread	.60@60&10%
Wood	.25%

Expanded Metal—

List No. 5.

Lathing	.10%
Fencing, Painted Sheets	.20%
Netting, Painted Sheets	.20%
Door Mats, Galvanized	.25%
Window Guards, Painted	.15%
Tree Guards, Painted	.15%

Extractors, Lemon Juice—

—See Squeezers, Lemon.

Fasteners, Blind—

Mackrell's, P. doz.	\$1.00, 20@20&10%
Van Sand's Screw Pat.	\$15 P. gr., 60&10%
Van Sand's Old Pat.	\$15 P. gr., 55&10%
Austin & Eddy No. 2008	P. gr., \$9.00
Security Gravity	P. gr., \$3.00
Zimmerman's	.45%

Faucets—

Fenn's	.40%
Bohren's Pat. Rubber Ball	.25%
Fenn's Cork Stops	.35%
Star	.60%
Fratt's Pat. Petroleum	.60%
B. & L. B. Co.	
West's Lock, Open and Shut Key	.50%
Star, Metal Plug, new list	.40%
Lockport, Metal Plug, reduced list	.60%
Metallic Key, Leather Lined	.60&10&10%
Cork Lined	.70&5&70&10%
Burnside's Red Cedar	.50%
Burnside's Red Cedar, bbl. lots	.50&10%
John Sommers	
Peerless Best Block Tin Key	.40%
IXL, 1st quality, Cork Lined	.50%
Diamond Lock	.40%
Perfection, Fla. Red Cedar	.50%
Goodenough Cedar	.50%
Boss Metallic Key	.50%
Reliable Cork Lined	.60%
Western Pattern Cork Lined	.50%
Self Measuring	
Enterprise, P. doz.	\$36.00, 20&10%
Lane's P. doz.	\$36.00, 25&10%
Victor	P. doz., \$36.00, 25&10%

Felloe Plates—

—See Plates, Felloe.

Fifth Wheels—

Derby and Cincinnati	.45&5%
Brewster	.50&5%

Files—**Domestic—**

Nicholson (X.F.) Files.....	60&10@
Nicholson's Royal Files (Seconds).....	75%
(extra prices on certain sizes)	
American.....	60&10&5@60&10&10%
G. & H. Barnett (Black Diamond).....	60&10@60&10&5%
Arcade.....	60&10@60&10&10%
Eagle.....	60&10&5@60&10&10%
Other makers, best brands.....	60&10@60&20%
Fair brands.....	60&10&10@70&25%
Second quality.....	70&10@75&10%
Heller's Horse Rasps.....	50&75@60&50%
McCaffrey's Horse Rasps.....	60&10%
Chelsea Horse Rasps, Hand Cut.....	60&10%
Chelsea Horse Rasps, Machine Cut.....	60&10%

Britten, Graham & Mathes, list Jan. 1890. 60&10&10%
Perkins' Burglar Proof. 60&10&10%
Plate. 30&10&10%
Barnes Mfg. Co. 10&40&10%
Yale. net prices
Deltz Flat Key. 30%
L. & C. Round Key Latches. 30&10%
L. & C. Flat Key Latches. 30&10%
Romer's Night Latches. 15%
Brooklyn Latches. 50&10%
Shepardson or U. S. 35%
Seed's N. Y. Hasp Lock. 25%

Padlocks—

List June 10, 1891. 50&25%
Norwich Lock Mfg. Co., old list. 70&25%
Yale Lock Mfg. Co.'s. net prices
Eagle. 25&24%
Eureka, Eagle Lock Co. 40&25%
Romer's, Nos. 0 to 91. 30%
Romer's Scandinavian, &c., Nos. 100 to 505. 15%
A. E. Deltz. 40%
Champion Padlocks. 40%
Hotchkiss. 30%
Star. 60%
Horseshoe. 40%
Barnes Mfg. Co. 40&40&10%
Nock's Pat. 30%
Brown's Pat. 25%
Scandinavian. 60&25%
E. T. Fram's Keystone Scandinavian, Nos. 119, 120, 130 and 140. 90&10%
Other Nos. 40%
Ames Sword Co. up to No. 150. 40%
Ames Sword Co. above No. 150. 50%
Slaymaker, Barry & Co.
No. 1010 line. 85&5%
No. 41 line. 45&10%
No. 61 line. 50&5%
No. 21 line. 70%
Clark's No. 1, 110, No. 2, 88 gr. 33&4%
Ferguson's. 33&4%
Victor. 60&10&25%
Walker's. 10%
Attwell Mfg. Co. 25&33&4%
Reading. 60&10&60&10&10%
Hammond's Window Springs. 40%
Common Sense, Jap'd, Cop'd and Br'zed. 40%
Common Sense, Nickel Plated. 40%
Universal. 30%
Kempshall's Gravity. 40%
Kempshall's Model. 40%
Corbin's Daisy, list Feb. 16, 1890. 70%
Payson's Perfect. 60&10%
Huganin's Sash Balances. 25&5&2%
Huganin's New Sash Locks. 25&5&2%
Stoddard's "Practical". 10%
Ives' Patent. 60&10&60&10&10%
Fish (Liescher's Pat.), No. 100, 40%
No. 105, 40%
Davis, Bronze, Barnes Mfg. Co. 50%
Champion Safety, list January, 1889. 70%
Security. 70%
Giant, list Jan., 1892. 70&5%
Wolcott's. 60&10&5%
Monarch. 50%

Sash, &c.—

Clark's No. 1, 110, No. 2, 88 gr. 33&4%
Ferguson's. 33&4%
Victor. 60&10&25%
Walker's. 10%
Attwell Mfg. Co. 25&33&4%
Reading. 60&10&60&10&10%
Hammond's Window Springs. 40%
Common Sense, Jap'd, Cop'd and Br'zed. 40%
Common Sense, Nickel Plated. 40%
Universal. 30%
Kempshall's Gravity. 40%
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Huganin's New Sash Locks. 25&5&2%
Stoddard's "Practical". 10%
Ives' Patent. 60&10&60&10&10%
Fish (Liescher's Pat.), No. 100, 40%
No. 105, 40%
Davis, Bronze, Barnes Mfg. Co. 50%
Champion Safety, list January, 1889. 70%
Security. 70%
Giant, list Jan., 1892. 70&5%
Wolcott's. 60&10&5%
Monarch. 50%

Lumber Tools—

See Tools, Lumber.

Lustro—

Four-ounce bottles. 40 doz, \$1.75; 40 gross, \$17.00

Machines.

Boring—

Without Augers. Upright. Angular.
Douglas. \$5.50 \$6.75. 50%
Snell's, Rice's Pat. 5.50 6.75, 40&10&10%
Jennings. 5.50 6.75, 45&45&10%
Other Machines. 2.35 2.75.
Phillips' Patent with Auger. 7.00 7.50.
Miller's Falls. 7.50 25%

Fluting—

Knox. 4 1/2-inch Rolls. \$2.25 each 35%
Knox. 6-inch Rolls. \$3.00 each 35%
Eagle. 3 1/2-inch Rolls. \$2.15. 35%
Eagle. 5 1/2-inch Rolls. \$2.85. 35%
Crown. 4 1/2 in. \$3.50; 6 in. \$4.00; 8 in. \$5.00 each. 35%
Crown Jewel. 6 in. \$5.50 each, 35%
American. 5 in. \$5.00; 6 in. \$5.40; 7 in. \$4.50 each. 35%
Domestic Fluter. each, \$1.50
Geneva Hand Fluter, White Metal. 40%
Crown Hand Fluter, Nos. 1, \$15.00; 2, \$12.50; 3, \$10.00. 50%
Shepard Hand Fluter, No. 80, per doz \$15.30. 40%
Shepard Hand Fluter, No. 110, 40%
Shepard Hand Fluter, No. 95, 40%
Clark's Hand Fluter, 40%
Combined Fluter and Sad Iron. 40%
Buffalo, 40 doz \$10.00. 10%

Hoisting—

Moore's Hand Hoist, with Lock Brake. 20%
Moore's Differential Pulley Block. 40%
Energy's Mfg. Co.'s. 25%
Sure Grip Steel Tackle Blocks. 25%

Washing—

Anthony Wayne, 40 doz, No. 1, \$51; No. 2, \$45; No. 3, \$42.
Western Star, 40 doz, No. 2, \$45; No. 3, \$42.
Weissell. 40 doz \$54.00
Fair and Square. 40 doz \$42.00

Mallets—

Hickory. 20&10&20&10&10%
Lignum vitae. 20&10&20&10&10%
B. & L. Block Co., Hickory & L. V. 30&30&10%
Mattocks—Regular list. 60&10&60&10&5%

Measures—

Standard Fiberware, No. 1, peck 40 dozen, \$4; 1/2-peck, \$3.50.

Meat Cutters—

See Cutters, Meat.

Menders, Harness—

Per doz. \$2.00

Mills—

Coffee—

Box and Side, list Jan. 1, 1888, 60&10%
Net prices are often made which are lower than above discount.
American, Enterprise Mfg. Co. 20&10&30%
The Swift, Lane Bros. 30%

Mining Knives—

See Knives, Mining.

Molasses Gates—

See Gates, Molasses.

Money Drawers—

See Drawers, Money.

Mowers, Lawn—

Philadelphia. 60&10%
Pennsylvania and Continental. 60%
New Model and Excelsior. 60&10%
Other Machines. 60&10&10&75%

Muzzles—

Safety. 40 doz, \$3.00, 25%

Nails—

Cut and Wire. See Trade Report.
Wire Nails, Papered.
Association list, May 1, '92, 80&10&10&5%
Tack Mfrs' list. 70&5&70&10%
Wire Nails, Standard Penny.
Card, Apr. 11, '92 base. \$1.80&\$1.85

Horse—

Nos. 6 7 8 9 10
American. 84 84 84 84 84. net
Ausable. 28 26 25 24 23
Clinton, Fin. 19 17 16 15 14. 40&5&5&2%
Essex. 28 26 25 24 23. 40&10%
Lyra. 19 17 16 15 14. 40&10%
Snowden. 19 17 16 15 14. 40&10%
Vulcan. 23 21 20 19 18. 25%
Northwest'n. 25 23 22 21 20. 25&25&5%
A. C. 25 23 22 21 20. 25&10&33&5%
C. B. K. 25 23 22 21 20. 33&33&10%
Maud S. 25 23 22 21 20. 40&10&5%
Champlain. 28 26 25 24 23. 40&5&5&2%
Sarnac. 23 21 20 19 18. 40&5%
Champion. 25 23 22 21 20. 10&10&10%
Capewell. 19 17 16 15 14. 16. 40%
Anchor. 23 21 20 19 18. 35%
Western. 23 21 20 19 18. 50%
Empire Bronzed. 13 14 15 16

Picture—

Brass Head, Sargent's list. 60&60&10%
Brass Head, Combination list. 50&10%
Porcelain Head, Sargent's list. 50&10&10%
Porcelain Head, Combination list. 40&10%
Niles' Patent. 40%

Nail Pullers—See Pullers, Nail.

Nail Sets—See Sets, Nail.

Nut Crackers—

See Crackers, Nut.

Nuts—List Dec. 18, 1889.

Hot Pressed. Square. Hex.
Cold Punched. 5.35 5.95 off list
In packages of 100 lb, add 1-10% off list
In packages less than 100 lb, add 1/2% off list.

Oakum—

Best or Government. 40 60 (47 1/4)
U. S. Navy. 40 54 (46 1/4)
Navy. 40 54 (46 1/4)

Oilers—

Zinc and Tin. 65&10&70&5%
Brass and Copper. 50&10&50&10&5%
Malleable, Hammers' Improved, No. 1, \$3.00; No. 2, \$4.00; No. 3, \$4.40 40%
Malleable, Hammers' Old Pattern, same list. 45%
Prior's Pat. or "Paragon" Zinc. 60&10&10%
Prior's Pat. or "Paragon" Brass. 50%
Olmstead's Tin and Zinc. 60%
Olmstead's Brass and Copper. 50%
Broughton's Zinc. 60%
Broughton's Brass. 50%
Gem, P. D. & Co. 40%
Steel, Draper & Williams. 50%

Openers, Can—

Messenger's Comet. 40 doz \$3.00, 25%
American. 40 gross \$2.75&\$3.00
Duplex. 40 doz 25¢, 15¢&20¢
Lyman's. 40 doz \$3.75, 20%
No. 4, French. 40 doz \$2.25, 55¢&60¢
No. 5, Iron Handle. 40 gr \$3.00, 45¢&50¢
Eureka. 40 doz \$2.50, 10%
Sardine Sissors. 40 doz \$2.75&3.00
Star. 40 doz \$2.75
Sprague, No. 1, \$2.00; 2, \$2.25; 3, \$2.50; 4, \$2.75 10&10&10%
World's Best, 40 gross, No. 1, \$12.00; No. 2, \$24.00; No. 3, \$36.00. 50&10%
Universal, 40 doz \$3.00. 55&5%
Domestic, 40 doz \$2.00. 45%
Champion, 40 doz \$2.00. 50%

Packing, Steam—

Rubber—

Standard. 70&70&10%
Extra. 60&60&5%
N. Y. B. & P. Co. Standard. 50%
N. Y. B. & P. Co. Empire. 50%
N. Y. B. & P. Co. Salamander. 25%
Jenkins' Standard, 40 gr. 25&25&5%

Miscellaneous—

American Packing. 10¢&11¢
Russia Packing. 14¢
Italian Packing. 13¢&14¢
Cotton Packing. 15¢&17¢
Jute. 7¢&8¢

Pails—

Galvanized—

Quarts 10 12 14
Hill's Light Weight, 40 doz. \$2.75 3.00 3.25
Hill's Heavy Weight, 40 doz. 3.00 3.25 3.75
Helwig's. 2.50 2.75 3.00
Sidney Shepard & Co. 2.35 2.55 3.05
Iron Clad. 2.50 2.75 3.00
Fire Buckets. 2.75 3.25 3.50
Buckets—See Well Buckets.

Indurated Fiber Ware—25%

Star Pails, 12 qt. 40 doz \$5.40
Stable and Milk, 14 bt. 40 doz \$6.00
Fire Pails, deep. 40 doz \$5.40
Fire Pails, round bottom. 40 doz \$7.80

Standard Fiber Ware—

Water Pails, 12 qt., 40 doz. \$4.00 \$4.50
Dairy Pails, 14 qt., 40 doz. 4.50 5.00
Fire Pails, No. 1, 12 qt., 40 doz. 4.50 5.00
Fire Pails, No. 2, 14 qt., 40 doz. 5.00 5.50
Sugar Pails. 6.00 6.50
Horse Pails. 6.00
Buggy Pails. 4.00
Slop Jars (bal. trap). 8.00 9.00
Chamber Pails, 14 qt. 6.50 7.50

Pans—

Dripping—

Small sizes. 40 6 1/4
Large sizes. 40 6 3/4
Silver & Co. (Covered). 40%

Fry—

Standard list.
No. 0 1 2 3 4
40 doz. \$3.00 \$3.75 \$4.25 4.75 \$5.25
No. 5 6 7 8
40 doz. \$6.00 \$7.00 \$8.00 \$9.00
Polished, regular goods. 75¢&75¢&10%
Acme Fry Pans. 60%

Dust—

Steel Edge, No. 1. 40 doz \$1.75

Paper and Cloth—

Sand and Emery—

List April 19, 1886. 50&10&50&10&5%
Sibley's Emery and Crocus Cloth. 30%

Parers—

Apple—

Advance. 40 doz \$4.75
Baldwin. 40 doz 5.25
Bonanza. each 5.00
Daisy. 40 doz 4.00
Dandy. each 7.50
Eclipse. 40 doz 4.25
Eureka, 1888. each 16.00
Family Bay State. 40 doz 12.00
Favorite. 40 doz 5.00
Gold Medal. 40 doz 4.00
Ideal. 40 doz 4.00
Improved Bay State. 40 doz 27.00&30.00
Little Star. 40 doz 4.50
March. 40 doz 13.50
New Lightning. 40 doz 5.50
Oriole. 40 doz 4.00
Penn. 40 doz 4.00
Perfection. 40 doz 4.00
Pomona. 40 doz 4.00
Rocking Table. 40 doz 6.00
Turn Table. 40 doz 4.50
Victor. 40 doz 13.50
Waverly. 40 doz 4.00
White Mountain. 40 doz 4.00
72. 40 doz 4.25
78. 40 doz 7.00

Potato—

White Mountain. 40 doz \$4.50
Antrim Combination. 40 doz \$5.50
Hoosier. 40 doz \$13.50
Saratoga. 40 doz \$5.50

Pencils—

Faber's Carpenters. high list 50%
Faber's Round Gilt. 40 gr \$5.25
Dixon's Lead. 40 gr \$4.50
Dixon's Lumber. 40 gr \$6.75
Dixon's Carpenters. 10%

Picks—

Railroad or Adze Eye, 5 to 6, \$12.00; 6 to 7, \$13.00. 60&10&60&10&5%

Picture Nails—

See Nails, Picture.

Pinking Irons—

See Irons, Pinking.

Pins—

Bow—

Humason, Beckley & Co.'s. 60&10%
Sargent & Co.'s, \$17 and \$18. 60&10%
Peck, Stow & W. Co. 50&10&50&10&5%

Curtain—

Silvered Glass. net
White Enamel. net

Escutcheon—

Iron, list Nov. 11, 1885. 50&10&50&10&5%
Brass. 60&60&5%

Pipe, Wrought Iron—

List July 21, 1892.
1 1/4 and under, Plain. 67 1/2¢&67 1/2¢&10%
1 1/4 and under, Galv. 47 1/2¢&47 1/2¢&10%
1 1/2 and over, Plain. 67 1/2¢&67 1/2¢&10%
1 1/2 and over, Galv. 57 1/2¢&57 1/2¢&10%
Roller Tubes.
Sizes up to 2 1/2 in. inclusive. 55¢&57 1/2¢
Sizes 3 in. and larger. 67 1/2¢&67 1/2¢
Casing. 52 1/2¢
Inserted Joints Casing. 47 1/2¢
Steel Boiler Tubes. 27 1/2¢

Planes and Plane Irons—

Wood Planes—

Molding. 40&10&40&10&10&10%
Bench, First quality. 50&10%
Bench, Second quality. 55&10%
Bailey's (Stanley R. & L. Co.). 50&10%

Iron Planes—

Bailey's (Stanley R. & L. Co.). 50&10%
Miscellaneous Planes (Stanley R. & L. Co.). 25&10%
Steers' Iron Planes. 35¢&35¢&10%
Meriden Mal. Iron Co.'s. 40¢&40¢&10%
Davis' Iron Planes. 40¢&40¢&10%
Birmingham Plane Co. 50¢&50¢&10%
Gage Tool Co.'s Self-Setting. 30¢&30¢&10%
Chaplin's Iron Planes. 40¢&40¢&10%
Sargent's. 60%
Standard Tool Co. 50¢&50¢&5%

Plane Irons—

Butcher's. 50¢&50¢&25 to 2
Buck Bros. 30%
Auburn Thistle. 30&10%
Ohio. 30&10%
Sandusky. 25
L. & J. White. 25
Stanley R. & L. Co. 50&10%

Plates—

Felloe. 40 6 1/4

Pliers and Nippers—

Button's Patent. 50&50&10%
Hall's No. 2, 5 in., \$13.50; No. 4, 7 in. 40%
Humason & Beckley Mfg. Co. 60&50&10%
Lindsay's Giant. 33 1/2%
Gas Pliers. 60%
Gas Pliers, Custer's Nickel Plated. 60&5%
Eureka Pliers and Nippers. 40%
Russell's Parallel. 25%
P. S. & W. Co. Steel. 50%
P. S. & W. Tinner's Cutting Nippers. 40%
Carew's Pat. Wire Cutters. 20%
Morrill's Parallel, 40 doz, \$12.00. 30&5%
Cronk's 8 in., \$15.00; 10 in., \$21.00. 50&5%
Cronk's Button Pattern. 50&10&60%
Cronk's Carrier Pliers. 60&60&5%

Plumbs and Levels—

Regular list. 75&10¢&75&10&5%
Stanley's Duplex. 20&10%
Stanley's Handy. 20&10%
Dixton's. 50%
Pocket Levels. 70&10¢&70&10&10%
Davis Iron Levels. 30%
Davis' Inclinometers. 10&10%

Poachers, Egg—

Buffalo Steam Egg Poachers, 40 doz. No. 1, \$6.00; No. 2, \$9.00. 25%
Silver & Co., 6-Ring, 40 doz, \$4.00; 3-Ring. 40 doz, \$2.00

Pokes, Animal—

Bishop's I. X. L. 40 doz \$6.00
Bishop's O. K. 40 doz \$5.25
Bishop's Pioneer. 40 doz \$3.75
Bishop's American. 40 doz \$2.75
Eagle, Double Stale. 40 doz \$5.75
Eagle, Single Stale. 40 doz \$3.75
Buckeye, Single Stale. 40 doz \$2.75
Bolding. 40 doz \$6.00

Police Goods—

R. I. Tool Co., Handcuffs, \$15.00 40 doz 10%
R. I. Tool Co., Hand Irons, \$25.00 40 doz 10%
Towers. 25%
Daley's Improved Handcuffs; 2 Hands, Polished, 40 doz, \$48.00; Nickeled, \$57.00; 3 hands, Polished, 40 doz, \$72.00; Nickeled, \$84.00. 25%
J. P. Lovell's Police Goods. 25%

Polish—

Metal—

Prestoline. 30%
Prestoline Paste. 33 1/2%
Gaston's Silver Compound. 3

Presses—**Fruit and Jelly—**

Enterprise Mfg. Co. 20¢10¢90¢
Hemlock 10¢ doz \$3.50
Shepard's Queen City 40¢
Silver & Co. 10¢ doz \$2.75

Pruning Hooks and Shears—See Shears.**Pullers, Nail—**

Scranton 10¢ doz, \$18.00, 33¢
Curtis Hammer 10¢ doz, \$9.00
Giant, No. 1 10¢ doz, \$15.00, 10¢
Giant, No. 2 10¢ doz, \$15.00, 10¢
Pelican 10¢ doz, \$10.00, 25¢
Eclipse 10¢ doz, \$2.00, net
Economy 10¢ doz, \$6.00

Pulleys—

Hot House, Awning, &c. 60¢10¢
Japanned Screw 60¢10¢
Japanned Side 60¢10¢
Japanned Clothes Line 60¢10¢
Empire Sash Pulley 55¢60¢
Moore's Sash, Anti-Friction 50¢
Hay Fork, Solid Eye, 40¢; Swivel, 44¢
Hay Fork, "Anti-Friction," 5 in. solid, \$5.70
Hay Fork, "F" Common and Patent Bushed 20¢
Hay Fork, Tarbox Pat. Iron 20¢
Hay Fork, Reed's Self-Lubricating 40¢
Shade Rack 40¢
Tackle Block—See Block
Moore's Anti-Friction 5 in. Wheel, 10¢ doz, \$12.00

Pumps—

Cistern, Best Makers 60¢60¢10¢
Pitcher Spout, Best Makers 67¢70¢
Pitcher Spout, Cheaper G'ds. 75¢75¢10¢

Punches—

Saddler's or Drive, good, 10¢ doz, 60¢65¢
Bemis & Call Co.'s Cast Steel Drive, 50¢55¢
Bemis & Call Co.'s Springfield Socket, 50¢55¢
Spring, good quality, 10¢ doz, \$2.00, 25¢
Spring, Leach's Pat. 15¢
Bemis & Call Co.'s Spring and Check, 40¢
Solid Timbers, P., S., & W. Co., 10¢ doz, \$1.44
Timbers' Hollow Punches, P., S., & W. Co., 20¢25¢
Rice Hand Punches 15¢
Avery's Revolving 40¢
Avery's Sawset and Punch—See Sawsets.

Rail—

Sliding Door, Wrt Brass, 10¢ ft, 35¢, 40¢
Sliding Door, Bronzed Wrt Iron, 10¢ ft, 7¢
Sliding Door, Iron, Painted, 10¢ ft, 4¢, 40¢
Barn Door, Light, 10¢ ft, 3¢
Per 100 feet \$2.00 2.50 3.10, 10¢
B. D. for N. E. Hangers Med. Large, \$3.15 2.70 3.25 Net
Terry's Steel Rail, 10¢ ft, 44¢
Victor Track Rail, 7¢ ft, 50¢55¢
Carrier, double braced, Steel Rail, 10¢ ft, 44¢
Moore's Wrought Iron 25¢
Moody Steel Rail 45¢

Rakes—

Cast Steel, Association Goods, 60¢70¢
Cast Steel, outside g'ds, 60¢10¢70¢55¢
Malleable 70¢70¢55¢
Gibbs Lawn Rake 10¢ doz, \$4.90
Canton Lawn Rake 10¢ doz, \$3.75
Favorite Lawn Rake 10¢ doz, \$4.40
Onelda Lawn Rake 10¢ doz, \$6.00
Fort Madison Prize Bow Brace and Feetless 60¢
Fort Madison Steel Tooth Lawn Rake, \$6.00 25¢

Razors—

J. R. Torrey Razor Co. 20¢
Wostenholm and Butcher, \$10 to \$15
Jordan's AAA, new list Net
Jordan's Old Faithful, new list Net
Galvanic 10¢ doz, \$15.00
Electric Cutlery Co. Net
Campbell Cutlery Co. Net

Razor Stroppers—

See Stroppers, Razor.

Rings and Ringers—**Bull Rings—**

Union Nut Co. 55¢
Sargent's 75¢10¢
Hotchkiss' low list 30¢
Humason, Beckley & Co.'s 70¢10¢
Peck, Stow & W. Co.'s, 50¢10¢50¢10¢10¢
Ellich Hdw. Co., White Metal, low list, 50¢50¢10¢

Hog—

Top of the Hill Rings 10¢ doz \$2.00
Top of the Hill Rings 10¢ doz \$1.25
Hill's Improved Ringers 10¢ doz \$1.25
Hill's Old Style Ringers 10¢ doz \$1.12½
Hill's Tongs 10¢ doz \$3.00
Hill's Rings 10¢ doz bxs \$1.00
Perfect Rings 10¢ doz bxs \$1.50
Perfect Rings 10¢ doz \$2.15, 22¢
Blair's Hog Ringers 10¢ doz \$2.00
Blair's Hog Ringers 10¢ doz \$0.90, \$1.00
Champion Ringers 10¢ doz \$2.00
Champion Ringers, Double 10¢ doz \$2.25
Brown's Ringers 10¢ doz \$2.00
Brown's Ringers 10¢ doz \$1.15, \$1.25
Electric Hog Ringers 10¢ doz \$1.50
Electric Hog Ringers 10¢ doz \$2.00
Major Ringers 10¢ doz \$1.25
Major Ringers 10¢ doz \$2.00

Rivets and Burrs—

Iron, list Nov. 17, '87 40¢
Copper 60¢10¢
Coppered Iron, Bettina Brand 40¢

Rivet Sets—See Sets.**Rods—**

Stair, Brass 25¢30¢
Stair, Black Walnut 10¢ doz 40¢

Rollers—

Barn Door, Sargent's list 60¢10¢10¢
Acme Moore's Anti-Friction 55¢
Union Barn Door Roller 70¢
Thompson Mfg. Co.'s Lawn Rollers 30¢

Rope—

Manila, 7-16 in. diam. and larger 12¢12¢
Manila, 1/4 and 5-16 in. 13¢13¢
Manila, 1/2 and 3/4 in. 11¢11¢
Manila, Hay Rope 12¢12¢
Sisal 10¢10¢
Sisal, 7-16 inch and larger 10¢10¢
Sisal, 1/4 and 5-16 in. 11¢11¢
Sisal, Hay Rope 10¢10¢
Sisal, Tarred Rope 9¢9¢
Sisal, Medium Lath Yarn 9¢9¢
New Zealand, 7-16 in. & larger 8¢8¢
New Zealand, 1/4 and 5-16 inch, 9¢9¢
New Zealand, Hay Rope 8¢8¢
New Zealand, Tarred Rope 8¢8¢
Note—Manufacturers' prices on above 1¢ less, f.o.b. factory—less 1¢ for cash.
Cotton Rope 13¢13¢
Jute Rope 8¢8¢7¢

Wire—

List February, 1892.

All kinds 45¢

Rules—

Boxwood 80¢10¢10¢
Ivory 50¢50¢10¢
Starrett's Rules and Straight Edges, Steel 25¢10¢

Sad Irons—See Irons, Sad.**Sand and Emery Paper and Cloth—**

See Paper and Cloth.

Sash Cord—See Cord, Sash.**Sash Locks—See Locks, Sash.****Sash Weights—**

See Weights, Sash.

Sausage Stuffers or Fillers—See Stuffers or Fillers, Sausage.**Saws—The following prices are generally cut by jobbers.**

Disston's Circular 45¢45¢55¢
Disston's Cross Cut 45¢45¢55¢
Disston's Hand 25¢
Woodrough & McParlin 30¢30¢55¢
Hand, Panel and Rip 30¢30¢55¢
Narrow Champion Cross Cuts with Handles, 10 foot 18¢20¢
Champion Thin Back Cross Cuts, 10 foot 26¢28¢
Champion Extra Thin Back Cross Cuts, 10 foot 29¢31¢
One Man Champion Cross Cuts, 10 foot 37¢40¢
Wheeler, Madden & Clemson Mfg. Co. Hand, Panel and Rip 35¢35¢55¢
Narrow Champion Cross Cuts with Handles, 10 foot 18¢20¢
Champion Thin Back Cross Cuts, 10 foot 26¢28¢
Champion Extra Thin Back Cross Cuts, 10 foot 29¢31¢
One Man Champion Cross Cuts, 10 foot 37¢39¢
Atkins' Circular Shingle & Heading 50¢
Atkins' Silver Steel Diamond X Cuts 10 foot 70¢
Atkins' Special Steel Dexter X Cuts 10 foot 50¢
Atkins' Special Steel Diamond X Cuts 10 foot 82¢
Atkins' Champion and Electric Tooth 10 foot 30¢
Atkins' Hollow Back X Cuts, 10 foot 30¢
Atkins' Mulay, Mill and Drag 40¢
Atkins' One-Man Saw, with handles, 10 foot 40¢
Peace Circular and Mill 45¢45¢55¢
Peace Hand Panel and Rip 25¢25¢55¢
Peace Cross Cuts and Mill 45¢45¢55¢
Richardson's Circular and Mill 45¢45¢55¢
Richardson's X Cuts 45¢45¢55¢
Richardson's Hand, Ac. 25¢25¢55¢
C. E. Jennings & Co. Hand, Panel and Rip 25¢25¢10¢

Hack Saws—

Griffin's, complete 40¢10¢50¢
Griffin's Hack Saw Blades 40¢10¢50¢
Star Hack Saws and Blades 25¢
Eureka and Crescent 25¢

Scroll—

Lester, complete, \$10.00 25¢
Rogers, complete, \$4.00 25¢
Barnes' Builders' and Cab Makers' \$15.25 35¢
Barnes' Scroll Saw Blades 35¢

Saw Frames—

See Frames, Saw.

Saw Sets—See Sets, Saw.**Saw Tools—See Tools, Saw.****Scales—**

Hatch, Counter, No. 171, good quality, 10¢ doz \$21.00
Hatch, Tea, No. 161 10¢ doz \$6.75, \$7.00
Union Platform, Plain \$2.10, \$2.20
Union Platform, Striped \$2.40, \$2.50
Chattillon's Grocers' Trip Scales 25¢
Chattillon's Eureka 25¢
Chattillon's Favorite 40¢
Family Turnbills 30¢30¢10¢
Riehl Bros' Platform 40¢

Scale Beams—

See Beams, Scale.

Scissors, Fluting 45¢**Scrapers—**

Adjustable Box Scraper (S. R. & L. Co.) \$6.50 30¢10¢
Box, 1 Handle 10¢ doz \$4.00, 10¢
Box, 2 Handle 10¢ doz \$6.00, 10¢
Denance Box and Ship 20¢10¢
Foot 50¢10¢50¢
Ship, Common 10¢ doz \$3.50 net
Ship, R. I. Tool Co. 10¢

Screen Window and Door Frames—See Frames.**Screw Drivers—**

See Drivers, Screw.

Screws—**Bench and Hand—**

Bench, Iron 55¢10¢55¢10¢10¢
Bench, Wood, Beech 10¢ doz \$2.25
Bench, Wood, Hickory 10¢ doz \$2.10
Hand, Wood 25¢10¢25¢10¢5¢
Hand, Grand Rapids, list 35¢
Lag, Blunt Point, list Jan. 1, 1890, 75¢10¢
Coach and Lag, Gimlet Point, list Jan. 1, 1890, 75¢10¢
Bed 25¢25¢
Hand Rail, Sargent's 70¢10¢
Hand Rail, H. & F. Mfg. Co. 70¢10¢75¢
Hand Rail, Am. Screw Co. 75¢
Jack Screws, Millers Falls list, 50¢50¢10¢
Jack Screws, P. S. & W. 35¢
Jack Screws, Sargent 70¢
Jack Screws, Stearns 40¢40¢10¢

Cork—

Humason & Beckley Mfg. Co. 40¢10¢50¢
Williamson's 33¢33¢55¢
Howe Bros. & Hulbert 35¢

Machine—

Flat Head Iron 65¢
Round Head Iron 60¢

Wood—

List January 1, 1891.
Flat Head Iron 70¢
Round Head Iron 65¢ Extra 10 or 15 often given.
Flat Head Brass 70¢
Round Head Brass 65¢
Flat Head Bronze 70¢
Round Head, Bronze 65¢
Rogers' Drive Screws 82¢

Scroll Saws—See Saws, Scroll.**Scythes—**

Grain 40¢50¢40¢10¢
Grass 40¢10¢50¢

Scythe Snaths—

See Snaths, Scythe.

Sets—

Awl and Tool—
Aiken's Sets, Awls and Tools 55¢10¢
No. 20, 10¢ doz \$10.00 55¢10¢
Fray's Adj. Tool Hds., Nos. 1, 12; 2, 18; 3, 12; 4, 30 45¢
Millers Falls Adj. Tool Hds. Nos. 1, 12; 2, 18 25¢
Henry's Combination Haft 10¢ doz \$6.50
Stanley's Excelsior: No. 1, \$7.50; No. 2, \$4.00; No. 3, \$5.50 30¢10¢
Common Brad Sets, No. 42, \$10.50; No. 43, \$12.50 70¢10¢55¢

Nail—

Square 10¢ gr. \$4.00, \$4.25
Round 10¢ gr. \$3.25
Buck Bros 27½¢
Cannon's Diamond Point 10¢ gr. \$12.20

Rivet—

Regular list 60¢

Saw—

Stillman's Genuine 10¢ doz \$5.00, 7.75, 40¢55¢
Stillman's Pattern, Hand, 10¢ doz \$3.25 55¢
Cross Cut, \$5.25 10¢
Common Lever 10¢ doz \$2.00, 45¢50¢
Morrell's No. 1, \$15.00 40¢20¢
No. 11, \$15.00 40¢10¢40¢10¢55¢
Nos. 3 and 4, \$18.00 40¢55¢
No. 5, \$24.00 40¢55¢
Leach's, No. 0, \$8.00; No. 1, \$15.00 15¢20¢
Nash's 20¢10¢20¢10¢10¢
Hammer, Hotchkiss \$5.50, 10¢
Hammer, Bemis & Call Co.'s new Pat. 30¢55¢
Bemis & Call Co.'s Lever and Spring Hammer 30¢55¢
Bemis & Call Co.'s Plate 10¢
Bemis & Call Co.'s Cross Cut 12½¢
Aiken's Genuine \$13.00, 50¢10¢60¢
Aiken's Imitation \$7.00, 65¢55¢
Hart's Pat. Lever 20¢
Disston's Star 25¢
Leopold 40¢10¢50¢
Atkin's Lever 10¢ doz \$1.15, \$1.00
Atkin's Criterion 10¢ doz No. 1, \$6.00
Croissant (Keller), No. 1, \$15.00; No. 2, \$24.00 40¢10¢
Avery's Saw Set and Punch 50¢
Chieftain Co.'s Superior 10¢ doz \$7.00
Chieftain Co.'s Royal 10¢ doz \$7.50
Crescent 10¢ doz \$8.00
Lloyd's Acme 10¢ doz \$15.40, 10¢
Taintor Positive 10¢ doz \$18.50

Sharpeners, Knife—

Larkins'
Applewood Handles 10¢ doz \$6.00, 40¢
Rosewood or Cocobola 10¢ doz \$9.00 40¢

Shaves, Spoke—

Iron 45¢
Wood 30¢
Bailey's (Stanley R. & L. Co.) 40¢10¢
Stearns 30¢10¢
Cincinnati 25¢10¢
Goodell's 10¢ doz \$9.00 25¢

Shears—

American (Cast) Iron, 75¢10¢75¢10¢55¢
Barnard's Lamp Trimmers 10¢ doz \$3.75
Tine 20¢25¢
Seymour's, list Dec. 1881 60¢10¢10¢60¢10¢10¢55¢
Heinisch's, list Dec. 1881 60¢10¢10¢60¢10¢10¢55¢
Heinisch's Tailors' Shears 33¢55¢
Cast Steel Trimmers: First quality 80¢80¢10¢
Second quality 80¢10¢80¢10¢10¢
Acme Cast Shears 10¢10¢
Diamond Cast Shears 10¢
Clipper 10¢10¢
Victor Cast Shears 75¢10¢75¢10¢55¢
Howe Bros. & Hulbert, Solid Forged Steel 40¢
Chicago Drop Forge & F. Co., Solid Steel Forged 60¢
Davenport Cutlery Co. 60¢60¢10¢
Clausen Shear Co., Japanned 70¢
Clausen Shear Co., Nickel, same list, 90¢
Galvanic 3/4 to 9 in., 10¢ doz \$1.00 10¢ inch
Electric Cutlery Co. Net
Campbell Cutlery Co., Jap'd 75¢
Nickel Plated 65¢

Pruning Shears and Hooks.

Disston's Combined Pruning Hook and Saw 10¢ doz \$18.00, 20¢10¢
Disston's Pruning Hook, 10¢ doz \$12.00 20¢10¢
E. S. Lee & Co.'s Pruning Tools 40¢
Pruning Shears, Henry's Pat. 10¢ doz \$3.75, \$4.00
Henry's Pruning Shears, 10¢ doz \$4.25 \$4.50

Wheeler, M. & C. Co., Combination, 10¢ doz \$12.00, 20¢

Dunlap's Saw and Chisel, 10¢ doz \$8.50, 30¢
J. Mallinson & Co., No. 1, \$5.25; No. 2, \$7.25
P. S. & W. Co. 60¢

Tinners', &c.—

Shears and Snips (P. S. & W.) 20¢25¢
Snips, J. Mallinson & Co. 33¢45¢

Sheaves—**Sliding Door—**

M. W. Co., list July, 1888 50¢10¢60¢55¢
R. & E., list Dec. 18, 1885 55¢20¢
Corbin's list 60¢10¢25¢
Patent Roller, Hatfield's 75¢
Russell's Anti-Friction, list Dec. 18, 1885 60¢25¢
Moore's Anti-Friction 50¢

Sliding Shutter—

R. & E., list Dec. 18, 1885 60¢10¢25¢
Sargent's list 70¢
Reading list 60¢10¢10¢

Shells—

First quality 4, 8, 10 and 12 gauge 25¢10¢25¢
First quality Rival, Club and Climax brands, 14, 16 and 20 gauge (\$7.50 list) 20¢10¢25¢
Star, Club, Rival and Climax Brands 33¢45¢10¢25¢
Smokeless brand, 12, 10, 10 gauge 33¢45¢10¢25¢
Trap brand, 12 and 10 gauge 33¢45¢10¢25¢
Selbold's Comb. Shot Shells 15¢25¢
Brass Shot Shells, 1st quality 60¢25¢
Brass Shot Shells, Club, Rival, Climax 65¢25¢

Shells Loaded—

Standard List, July 10, 1890 40¢10¢10¢40¢10¢10¢55¢

Ship Tools—

L. & I. J. White 20¢55¢

Shoes, Horse, Mule, &c.—**Horse—**

Burden's Perkins', Phoenix, Diamond State & Bryden's Boss, at factory \$4.00
Bryden's Frog Pressure, at factory \$6.00

Mule—

Add \$1 1/2 keg to above prices.

Ox Wrought—

Ton lots 10¢ 9¢
1000 lb lots 10¢ 9¢
500 lb lots 10¢ 9¢

Shot—

Drop, up to B, 25-b bag	1.40	\$1.45
Drop, up to B, 5-b bag	.35	.35
Drop, B and larger, 25-b bag	1.65	1.70
Drop, B and larger, 5-b bag	.40	.40
Buck and Chilled, 25-b bag	1.65	1.70
Buck and Chilled, 5-b bag	.40	.40
Dust Shot, 25-b bag	2.00	2.00
Dust Shot, 5-b bag	.45	.45

Shovels and Spades—

Ames' Shovels, Spades, &c., list Nov. 1, 1885 30¢
Note—Jobbers frequently give 5¢7½¢ extra on above.
Griffith's Black Iron 50¢10¢
Griffith's C. S. 60¢60¢10¢
Griffith's Solid C. S. R. R. Goods 20¢
St. Louis Shovel Co. 20¢20¢7½¢
Hussey, Binns & Co. 15¢25¢
Hubbard & Co. 20¢20¢7½¢
Lehigh Mfg. Co. 50¢10¢
H. M. Myers Co. 30¢
Payne Pettebone & Son 33¢45¢
Remington's (Lowman's Pat.) 30¢10¢40¢
Rowland's Black Iron 60¢10¢
Rowland's Steel 60¢50¢60¢10¢
Terra Haute Shovel & Tool Co. 25¢

Shovels and Tongs—

Iron Head 60¢10¢60¢10¢55¢
Brass Head 60¢10¢10¢

Sieves—

Mann's Tin Rim 50¢25¢
Buffalo Metallic, S. S. & Co. 50¢25¢
Shaker (Barler's Pat.) Flour Sifters 10¢
Electric 10¢ doz \$2.00, 10¢
A. & W. Sifters 10¢ doz \$2.00
Hunter's 10¢ doz \$2.00

Sieves, Wooden Rim—

Mesh 18, Nested, 10¢ doz	80¢80	\$1.10
Mesh 20, Nested, 10¢ doz <td>.95</td> <td>1.10</td>	.95	1.10
Mesh 24, Nested, 10¢ doz <td>1.15</td> <td>1.25</td>	1.15	1.25

Skins, Thimble—

Western list 75¢55¢75¢10¢
Columbus Wrt. Steel, Special net prices
Coldbrookdale Iron Co. 60¢
Seneca Falls Pattern 60¢

Snaps Harness &c.

Anchor (T. & S. Mfg. Co.)	65¢
Fitch's (Bristol)	50¢10¢
Hotchkiss	10¢
Andrews	50¢
Sargent's Patent Guarded	70¢10¢10¢
German, new list	40¢10¢
Covert	50¢10¢5¢2¢
Covert, New Patent	50¢10¢5¢2¢
Covert, New R. E.	60¢10¢5¢2¢
Covered Spring	60¢10¢10¢
Covert's Saddlery Works' Triumph	33¢

Snaths, Scythe—

List	50¢50¢5¢
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Soldering Irons—

See Irons, Soldering.

Spittoons, Cuspidors, &c.**Standard Fiberware—**

Cuspidors, 8 1/2-inch, 1/2 doz., No. 5, 88; No. 5X, 90.	
Spittoons, Daisy, 8-inch, No. 1, 84; 10 and 11 inch, 85.	

Spoke Shaves—

See Shaves, Spoke.

Spoke Trimmers—

See Trimmers, Spoke.

Spoons and Forks—**Tinned Iron—**

Basting, Cen. Stamp, Co.'s list	70¢10¢
Solid Table and Tea, Cen. Stamp, Co.'s list	70¢10¢
Buffalo, S. S. & Co.	33¢5¢2¢

Silver Plated—

4 months or 5¢ cash 30 days:	
Meriden Brit. Co., Rogers	40¢15¢
C. Rogers & Bros.	40¢15¢
Rogers & Bros.	40¢15¢
Reed & Barton	40¢40¢5¢
Wm. Rogers Mfg. Co.	40, 15¢5¢
Simpson, Hall, Miller & Co.	40, 15¢5¢
Holmes & Edwards Silver Co.	40, 15¢5¢
L. Boardman & Son	50¢12¢5¢

Miscellaneous—

Holmes & Edwards Silver Co.:	
No. 67 Mexican Silver	50¢10¢5¢
No. 30 Silver Metal	50¢10¢5¢
No. 24 German Silver	50¢10¢5¢
No. 50 Nickel Silver	50¢5¢
No. 40 Nickel Silver	50¢10¢5¢
Wm. Rogers Mfg. Co.:	
Rogers' Silver Metal	50¢10¢5¢
185 Rogers' German Silver	60¢5¢
225 Rogers' Nickel Silver	50¢5¢
German Silver	50¢50¢5¢
German Silver, Hall & Elton	50¢5¢ cash
Nickel Silver	50¢5¢50¢10¢5¢ cash
Britannia	60¢50¢5¢
Boardman's Nickel Silver, list July 1, 1891	60¢7¢5¢
Boardman's Britannia Spoons, case lots	60¢5¢ cash

Springs—**Door—**

Torrey's Rod, 30 in.	1/2 doz \$1.20¢1.25
Gray's, 1/2 gr. \$20.00	25¢
Bee Rod, 1/2 gr. \$20.00	20¢25¢
Warner's No. 1, 1/2 doz \$2.50; No. 2, \$3.30	50¢50¢5¢
Gem (Coil), list April 19, 1886	10¢15¢
Star (Coil), list April 19, 1886	20¢20¢5¢
Victor (Coil)	60¢10¢50¢10¢5¢
Champion (Coil)	60¢10¢50¢10¢5¢
Cowell's, No. 1, 1/2 doz \$18.00; No. 2, \$15.00	50¢50¢10¢
Rubber, complete, 1/2 doz \$4.50	55¢10¢
Hercules	50¢50¢10¢

Carriage, Wagon, &c.—

Elliptic, Concord, Platform and Half Scroll	60¢10¢10¢
Cliff's Bolster Springs	25¢

Squares—

Steel and Iron	85¢85¢5¢
Nickel-Plated	85¢85¢5¢
Try Square and T Bevels	60¢10¢10¢
Diston's Try Square and T Bevels	50¢
Winterbottom's Try and Miter	30¢10¢
Starrett's Micrometer Caliper Squares	25¢
Avery's Flush Bevel Squares	40¢
Avery's Bevel Protractor	50¢

Squeezers—**Fodder—**

Blair's	1/2 doz \$2.00
Blair's "Climax"	1/2 doz \$1.25

Lemon—

Porcelain Lined, No. 1	1/2 doz \$6.00
Wood, No. 2	1/2 doz \$3.00, 35¢
Wood, Common	1/2 doz \$1.70¢1.75
Dunlap's Improved	1/2 doz \$3.75, 20¢
Samuels, No. 1, \$5.00; No. 2, \$4.12	1/2 doz \$5.10¢
Jennings' Star	1/2 doz \$2.50
The Boss	1/2 doz \$2.50
Dean's, Nos. 1, 1/2 doz \$0.50; 2, \$3.35; 3, \$1.90; Queen, \$2.50	
Little Giant	60¢50¢5¢
King	40¢50¢5¢
Hotchkiss Straight Flash	1/2 doz \$12.00
Silver & Co., Glass	1/2 gr. \$9.00
Manny Lemon Juice Extractor:	
Standard	1/2 doz \$0.75¢1.00
Improved	1/2 doz \$2.00

Standard Fiber Ware—

See Ware, Standard Fiber.

Staples—**Blind—**

Barbed, 1/4 in. and larger	1/2 doz \$7¢4¢
Barbed, 1/4 in.	1/2 doz \$8¢5¢
Fence Staples, Galvanized	1/2 doz \$1.00
Fence Staples Plain	1/2 doz \$1.00

Steelyards

40¢10¢50¢

Stocks and Dies—

Blacksmith's:	
Waterford Goods	35¢
Butterfield's Goods	35¢
Lightning Screw Plate	25¢30¢
Reese's New Screw Plates	25¢30¢
Reversible Ratchet	30¢
Gardner	25¢
Green River	25¢30¢

Stops, Bench—

Morrill's	1/2 doz \$9, 50¢
Hotchkiss's	1/2 doz \$5, 10¢10¢10¢
Weston's, No. 1, \$10; No. 2, \$9, 25¢10¢5¢	
McGill's, 1/2 doz \$3	10¢
Cincinnati	25¢10¢
Terrell's Nos. 1 and 2, 1/2 doz., \$3; No. 3, \$3.60	30¢

Stone—**Sythe Stones—**

Pike Mfg. Co., list April, 1892	33¢
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Oil Stones, &c.—

Pike Mfg. Co.:	
Hindustan No. 1	8¢
Sand Stone	5¢
Turkey Oil Stone, 4 to 8 in.	40¢40¢10¢
Turkey Slips	\$2.00
Washita Stone, Extra	50¢
Washita Stone, No. 1	40¢
Washita Stone, No. 2	40¢
Washita Slips, Extra	80¢
Washita Slips, No. 1	70¢
Arkansas Stone, No. 1, 3 to 2 1/2 in.	\$2.80
Arkansas Stone, No. 1 1/2 to 8 in.	\$3.50
Lake Superior	1/2 doz \$13¢
Lake Superior Slips	1/2 doz \$20¢

Stove Polish—

See Polish, Stove.

Stretchers, Carpet—

Cast Steel, Polished	1/2 doz \$2.2
Cast Iron, Steel Points	1/2 doz \$0.8¢
Socket	1/2 doz \$1.75
Bullard's	25¢25¢10¢

Strops, Razor—

Genuine Emerson	60¢60¢5¢
Imitation	1/2 doz \$2.00, 30¢10¢5¢
Torrey's	20¢
Badger's Belt and Com.	1/2 doz \$2.00
Lamont Combination	1/2 doz \$4.00
Jordan's Pat. Padded, list Nov. 1, '89, 50¢	
Electric Cutlery Co.	Net
Campbell Cutlery Co.	Net

Stuffer or Fillers,**Sausage—**

Miles' Challenge, 1/2 doz \$20	50¢50¢5¢
Perry, 1/2 doz, No. 1, \$15.00; No. 2, \$21.00	50¢50¢50¢10¢
Draw Cut No. 4, each \$30.00	30¢
Enterprise Mfg. Co.	30¢10¢30¢
Silver's	40¢10¢

Sweepers, Carpet and Lawn—

Bissell No. 5	1/2 doz \$17.00
Bissell No. 8	1/2 doz \$20.00
Bissell, Grand	1/2 doz \$36.00
Standard	1/2 doz \$24.00
Domestic	1/2 doz \$21.00
Domestic, No. 2	1/2 doz \$22.00
Grand Rapids	1/2 doz \$24.00
Crown Jewel, No. 1	\$18.00, No. 2, \$19.00; No. 3, \$20.00
Magie	1/2 doz \$15.00
Improved Parlor Queen	1/2 doz \$27.00
Nickel	1/2 doz \$24.00
Japanned	1/2 doz \$24.00
Excelsior	1/2 doz \$18.00
Garland	1/2 doz \$18.00
Parlor Queen	1/2 doz \$24.00
Housewife's Delight	1/2 doz \$15.00
Queen	1/2 doz \$16.00
Queen, with band	1/2 doz \$18.00
King	1/2 doz \$30.00
Week Improved	1/2 doz \$18.00
Hub	1/2 doz \$16.00
Cog-Wheel	1/2 doz \$16.00
Easy	1/2 doz \$22.00
Monarch	1/2 doz \$22.00
Goshen	1/2 doz \$21.00
Ladies' Friend	1/2 doz \$15.00
Advance	1/2 doz \$18.00
Supreme	1/2 doz \$22.00

Lawn—

Thompson Mfg. Co.	30¢
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Tacks, Brads, &c.—

List October 19, 1893. Old established straight weights. Short Weight goods are sold at lower prices.

Carpet Tacks—	
American, Blue	60¢5¢
American, Tin'd and Cop'd	70¢
Steel, Bright and Blue	60¢5¢
Steel, Tinned and Coppered	70¢
Swedes Iron, Tinned	75¢5¢
American Iron Tacks, Domestic	60¢5¢
Swedes Iron Tacks—	
S. S., Blue	60¢5¢
S. S., Tinned	70¢
Lanc, Blue	55¢
Lanc, Tinned	60¢
Gimp and Lace Tacks—	
S. S., Blue	62¢5¢
S. S., Tinned	60¢5¢
Lanc, Blue	55¢
Lanc, Tinned	60¢
Basket and Trimmers' Tacks—	
S. S.	52¢5¢
Hungarian Nails	60¢
Common and Patent Brads	50¢
Leathered Tacks	10¢
Brush Tacks, S. S.	60¢
Looking Glass Tacks, S. S.	35¢
Picture Frame Points, S. S.	35¢
Finishing Nails	60¢
Trunk and Clout Nails—	
Black	60¢5¢
Tinned or Coppered	60¢5¢
Basket Nails	60¢
Chair Nails	65¢5¢
Clear Box Nails	65¢5¢
Tin Caped Nails	50¢

Miscellaneous—

Double Point	90¢90¢10¢
Wire Carpet Nails	50¢10¢
Plymouth Rock Steel Carpet Tacks	25¢

Wire Brads and Nails—

Steel-Wire Brads, R. & E. Mfg. Co.'s list	
See also Nails, Wire.	
50¢10¢	

Tapes, Measuring—

American	40¢40¢5¢
Spring	40¢
Chesterman's, Regular list	25¢30¢

Thermometers—

Tin Case	80¢90¢10¢
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Thimble Skeins—See Skeins.**Ties, Bale—Steel.**

Standard Wire, list	50¢10¢5¢
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Tinners' Shears, &c—

See Shears, Tinners' &c.

Tinware—

Stamped, Japanned and Piced, list Jan 20, 1887	70¢10¢70¢25¢
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Tire Benders, Upsetters, &c.—See Benders and Upsetters.**Tools—****Coopers'—**

Bradley's	20¢
Barton's	20¢20¢5¢
L. & J. White	20¢5¢
Albertson Mfg. Co.	25¢
Beatty's	30¢
Sandusky Tool Co.	30¢30¢5¢
Shaves Cincinnati Tool Co.	30¢

Lumber—

Ring Peavies, "Blue Line"	1/2 doz \$20.00
Ring Peavies, Common	1/2 doz \$18.00
Steel Socket Peavies	1/2 doz \$21.00
Mail, Iron Socket Peavies	1/2 doz \$19.00
Cant Hooks, "Blue Line"	1/2 doz \$16.00
Cant Hooks, Common Finish	1/2 doz \$14.00
Cant Hooks, Mail Socket Clasp, "Blue Line" Finish	1/2 doz \$16.00
Cant Hooks, Mail Socket Clasp, Common Finish	1/2 doz \$14.50
Cant Hooks, Clip Clasp, "Blue Line" Finish	1/2 doz \$14.00
Cant Hooks, Clip Clasp, Common Finish	1/2 doz \$12.00
Hand Spikes	1/2 doz 6 ft., \$15.00; 8 ft., \$20.00
Pike Poles, Pike & Hook	1/2 doz, 12 ft., \$11.50; 14 ft., \$12.50; 16 ft., \$14.50; 18 ft., \$17.50; 20 ft., \$21.50
Pike Poles, Pike only	1/2 doz, 12 ft., \$10.00; 14 ft., \$11.00; 16 ft., \$13.00; 18 ft., \$16.00; 20 ft., \$20.00
Pike Poles, not ironed	1/2 doz, 12 ft., \$6.00; 14 ft., \$7.00; 16 ft., \$9.00; 18 ft., \$12.00; 20 ft., \$16.00
Setting Poles	1/2 doz, 12 ft., \$14.00; 14 ft., \$15.00; 16 ft., \$17.00
Swamp Hooks	1/2 doz \$18.00

Saw—

Atkins' Perfection	1/2 doz \$12.00
Atkins' Excelsior	1/2 doz \$0.00
Atkins' Giant	1/2 doz \$4.00

Tobacco Cutters—

See Cutters, Tobacco.

Transom Lifters—

See Lifters, Transom.

Traps—**Game—**

Newhouse	40¢40¢5¢
Oneida Pattern	70¢10¢
Game, Blake's Patent	40¢10¢5¢

Mouse and Rat—

Mouse Wood, Choker	1/2 doz holes, 9¢10¢
Mouse, Round Wire	1/2 doz \$1.50 10¢
Mouse, Cage, Wire	1/2 doz \$2.50 10¢
Mouse, Catch-em-alive	1/2 doz \$2.50 15¢
Mouse, Bonanza	1/2 doz 0.90¢1.00
Rat, Decoy	1/2 gr \$10.00, 10¢
Ideal	1/2 gr \$10.00
Cyclone	1/2 gr \$10.00
Hotchkiss Metallic Mouse, 5-hole traps	1/2 doz, 75¢; in full cases, 1/2 doz \$0.60¢65¢
Hotchkiss Imp. Rat Killer	1/2 gr \$18.50
Hotchkiss New Rat Killer	1/2 gr \$16.50
Schuyler's Rat Killer	1/2 gr \$15.00

Triers—

Butter and Cheese	25¢
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Trimmers, Spoke—

Bonney's	1/2 doz \$10.00, 50¢
Stearns	20¢10¢
Ives', No. 1, \$15.00; No. 2, \$12.00	1/2 doz \$5¢10¢
Douglas	1/2 doz \$9.00, 20¢
Cincinnati	25¢

Trowels—

Lothrop's Brick and Plastering	20¢10¢5¢35¢
Reed's Brick and Plastering	10¢
Diston's Br'k and Plastering	25¢25¢5¢
Peace's Plastering	25¢25¢5¢
Clement & Maynard's	20¢20¢5¢
Rose's Brick	15¢20¢
Brade's Brick	25¢
Worrall's Brick and Plastering	20¢
Garden	70¢
Cleves' Angie Trowel, 1/2 gr. No. 1, \$36; No. 2, \$30; No. 3, \$15	net 10¢

Trucks, Warehouse, &c.—

B. & L. Block Co.'s list	40¢
Thompson Mfg. Co.	25¢

Tubes, Boiler—**See Pipe.****Twine—**

Flax Twine—		BC. B.
No. 9, $\frac{1}{4}$ and $\frac{1}{2}$ B Balls	25¢	31¢
No. 12, $\frac{1}{4}$ and $\frac{1}{2}$ B Balls	22¢	30¢
No. 18, $\frac{1}{4}$ and $\frac{1}{2}$ B Balls	20¢	29¢
No. 24, $\frac{1}{4}$ and $\frac{1}{2}$ B Balls	20¢	29¢
No. 30, $\frac{1}{4}$ and $\frac{1}{2}$ B Balls	18¢	28¢
No. 36, $\frac{1}{4}$ and $\frac{1}{2}$ B Balls	15¢	25¢
No. 204 Matras, $\frac{1}{4}$ and $\frac{1}{2}$ B Balls	50¢	54¢
Chalk Line, Cotton, $\frac{1}{4}$ B Balls	—	25¢
Mason Line, Linen, $\frac{1}{4}$ B Balls	—	55¢
2-Ply Hemp, $\frac{1}{4}$ and $\frac{1}{2}$ B Balls (Spring Twine)	—	15¢
3-Ply Hemp, 1 B Ball	16¢	19¢
Cotton Twine, $\frac{1}{4}$ B Balls	16¢	15¢
Cotton Wrapping, 5 Balls to a Doz.	15¢	16¢
2, 3, 4 and 5 Ply Jute, $\frac{1}{4}$ B Balls	—	10¢
Wool	—	8¢-10¢
Paper	—	13¢-14¢
Cotton Mops, 6, 9, 12 and 15 # to doz.	—	18¢

Washers—

Size hole..... 5-16 3/4 1/2 3/8 to 1 1/2
Washers..... 6 5 3.50 3
In lots less than 200 lb., 5¢ add 1/4¢, 5-
boxes 1¢ to list.

Wedges—

Iron..... 3¢ 3/4
Steel..... 3¢ 3/4

Weights, Sash—

Solid Eyes..... 1 ton \$18.00@19.00

**Well Buckets Galvan-
ized—See Buckets, Well, Gal-
vanized.**

Wheels, Well—

8 in., \$2.25; 10 in., \$2.70; 12 in., \$3.35

Wire and Wire Goods—

Iron—

Market, Br. & Ann., Nos. 0 to 18, 75¢@10¢@75¢@10¢
Cop'd, Nos. 0 to 18..... 75¢@5¢

Galv., Nos. 0 to 18..... 70¢@70¢@5¢
Tin'd, Tin'd list, Nos. 0 to 18, 70¢@70¢@10¢

Stone, Br. and Ann'd, Nos. 16 to 18..... 80¢
Bright and Ann'd, Nos. 19 to 26..... 80¢@5¢
Br. and Ann'd, Nos. 27 to 36..... 82¢@5¢
Tinned..... 82¢@5¢

Tinned Broom Wire, 18 to 21..... 4¢
Galvanized Fence, Nos. 8 and 9..... 70¢@10¢

Brass, list Jan. 18, 1884..... 35¢@33¢
Copper, list Jan. 18, 1884..... 35¢@40¢

Annecial Wire on Spools..... 60¢
Mallin's Steel and Tin'd on Spools..... 50¢

Mallin's Brass and Cop. on Spools..... 50¢
Tate's Spooled, Tin'd & Annealed..... 60¢@5¢

Tate's Spooled Cop. and Brass..... 50¢
Cast Steel Wire..... 50¢

Stub's Steel Wire..... \$1.00 to 2, 30¢
Steel Music Wire, 12 to 30, imported..... 60¢@70¢ 5¢

Wire Clothes Line, see Lines.
Wire Picture Cord, see Cord.

Bright Wire Goods—

Standard list..... 80¢@20¢@85¢

Wire Cloth and Netting—

Painted Screen Cloth, good quality, 100 sq. ft., \$1.40

Galvanized Wire Netting..... 75¢@75¢@10¢

Wire, Barb—

See Trade Report.

Wire Rope—See Rope, Wire.

Wrenches—

American Adjustable..... 40¢
Baxter's Adjustable "S"..... 40¢@10¢@50¢

Baxter's Diagonal..... 60¢
Coe's Genuine..... 50¢@3¢

Coe's "Mechanics"..... 50¢@10¢@3¢
Girard Standard..... 65¢@10¢@70¢

Lamson & Sessions' Engineers'..... 60¢@10¢
Lamson & Sessions' Standard..... 70¢@10¢

P. S. & W. Agricultural..... 75¢@10¢@80¢
Girard Agricultural..... 75¢@10¢@80¢

Lamson & Sessions' Agric'l..... 75¢@10¢@80¢
Bemis & Call's..... 35¢

Pat. Combination..... 35¢
Merrick's Pattern..... 35¢

Briggs' Pattern..... 25¢
Cylinder or Gas Pipe..... 40¢@5¢

No. 3 Pipe..... 40¢@10¢

Aiken's Pocket (Bright)..... \$0.00, 50¢@10¢

The Favorite Pocket..... 1/2 doz., \$4.00, 40¢

Webster's Pat. Combination..... 25¢

Boardman's..... 30¢

Always Ready..... 25¢@5¢

Aligator..... 50¢@10¢

Donohue's Engineer..... 50¢@2¢

Acme, Bright..... 50¢@2¢

Acme, Nickled..... 40¢@2¢

Hercules..... 70¢@70¢@5¢

Walker's..... 55¢@3¢

Diamond Steel..... 55¢@3¢

Cincinnati Brace Wrenches..... 25¢@10¢

Taft's Vise Wrench..... 55¢@10¢@3¢

Wringers, Clothes—

Am. Wringer Co.'s list July 1, '92, 2¢ cash

Colby Wringer Co., list Sept. 1, '91, 2¢ cash

Lovell Mfg. Co., list Jan. 1, 1892, 2¢ cash

Peerless Mfg. Co., list Feb., 1892, 2¢ cash

Wrought Goods—

Staples, Hooks, &c., list March 17, 1892, 85¢@25¢

Paints, Oils and Colors.—Wholesale Prices.

Animal and Vegetable

Oils—

Linseed, City, raw, per gal. 41

Linseed, City, boiled, 44

Linseed, Western, raw, 40

Lard, City, Extra Winter, 72 1/2

Lard, City, Prime, 70

Lard, City, Extra No. 1, 55

Lard, City, No. 1, 45

Lard, Western, prime, 70

Cotton-seed, Crude, prime, 28

Cotton-seed, Crude, off grades, 26

Cotton-seed, Summer Yellow, prime, 30

Cotton-seed, Summer Yellow, off grades, 29

Sperm, Crude, 67

Sperm, Natural Spring, 72

Sperm, Natural Winter, 73

Sperm, Bleached Winter, 78

Whale, Crude, 45

Whale, Natural Winter, 55

Whale, Bleached Winter, 58

Whale, Extra Bleached, 59

Sea Elephant, Bleached Winter, 62

Menhaden, Crude, Sound, 30

Menhaden, Crude, Southern, 30

Menhaden, Light Pressed, 37

Menhaden, Bleached W'ter, 38

Menhaden, Extra Bleached, 40

Tallow, City, prime, 44

Tallow, Western, prime, 42 1/2

Cocanut, Ceylon, 5 1/2

Cocanut, Coch., 6 1/2

Cod, Domestic, 42

Cod, Foreign, 42

Red Elaine, 34

Red Saponified, 4 1/2

Bank, 35

Straits, 38

Olive, Italian, blbls, 64

Neatfoot, prime, 50

Palm, prime, Lagos, 5 1/2

Mineral Oils—

Black, 20 gravity, 25 @ 30 cold test, 7 @ 7 1/2

Black, 20 gravity, 15 cold test, 7 1/2 @ 8

Black, 20 gravity, summer, 6 @ 6 1/2

Cylinder, light, filtered, 14 @ 16

Paints and Colors—

Barytes, Foreign, 10 ton, \$22.00 @24.00

Barytes, Amer. floated, 20.00 @32.00

Barytes, Amer. No. 1, 15.00 @17.00

Barytes, Amer. No. 2, 13.00 @15.00

Barytes, Amer. No. 3, 11.00 @12.00

Blue, Celestial, 6 @ 8

Blue, Chinese, 40 @ 50

Blue, Prussian, 25 @ 40

Blue, Ultramarine, 8 @ 25

Brown, Spanish, 1 1/2 @ 1

Brown, Sandyke, Amer., 3 @ 3 1/2

Brown, Vandyke, English, 6 @ 8

Carmin, No. 40, in bulk, 3.10 @

Carmin, No. 40, in boxes or barrels, 3.20 @

Carmin, No. 40, in ounce bottles, 4.20 @

Chalk, in bulk, 100 lb., 1.05 @ 1.90

Chalk, in blbls, 100 lb., 33 @ 40

China Clay, English, 10 ton, 13.00 @18.00

Cobalt Oxide, prep'd, 9.00 @11.00

Cobalt Oxide, black, lots 100 lb., 2.50 @

Cobalt Oxide, black, less 100 lb., 2.65 @ 2.90

Green, Paris, 170 @ 175 lb., 14 @ 16

Green, Paris, small pack, 15¢ @ 22

Green, Chrom., ordinary, 6 @ 12

Green, Chrom., pure, 22 @ 25

Lead, Eng., B.B. white, 8 1/2 @ 10

Lead, Amn. White, dry or in oil: Kags, lots less than 500 lb., 7 1/4 @ 7 1/2

Kags, lots 500 lb. to 5 tons, 6 1/2 @ 7

Kags, lots 5 tons to 12 tons, 6 1/2 @ 6 3/4

Kags, lots 12 tons and over, 6 1/2 @ 6 3/4

Lead, White, in oil, 25 lb. tin pails, add to keg price, @ 1/2

Lead, White, in oil, 12 1/2 lb. tin pails, add to keg price, @ 1

Lead, White, in oil, 1 to 5 lb. assorted tins, add to keg price, @ 1/4

Lead, Red, blbl, and 1/2 blbl, 6 1/4 @ 7 1/4

Lead, Red, kags, 6 1/4 @ 7 1/4

Litharge, kags, 6 1/2 @ 7 1/2

Litharge, blbls, and 1/2 blbls, 6 1/4 @ 7 1/4

TERMS, &c.—Lead and Litharge.—On lots of 500 lb. or over, 60 days' time or 2 1/2 % discount for cash if paid within 15 days of date of invoice.

Ocher, French Washed, 1.35 @ 1 1/4

Ocher, German Washed, 1 1/4 @ 3

Ocher, American, 1 1/4 @ 1 1/2

Orange Mineral, English, 8 1/2 @ 9

Orange Mineral, French, 10 @ 10 1/2

Orange Mineral, German, 8 1/2 @ 9

Orange Mineral, American, 8 1/2 @ 8 1/2

Paris White, English Cliff-stone, 1.00 @1.15

Paris White, American, 70 @ 75

Red, Indian, English, 5 1/2 @ 7

Red, Indian, American, 5 @ 6 1/2

Red, Tuscan, 9 @ 11

Red, Venetian, American, 100 lb., 1.00 @1.10

Red, Venetian, English, 1.20 @1.35

Sienna, Italian, Burnt and Powd., 100 lb., 4 @ 5

Sienna, Ital., Burnt Lumps, 1 1/2 @ 3 1/2

Sienna, Ital., Raw, Powd., 4 1/2 @ 5 1/2

Sienna, Ital., Raw, Lumps, 1 1/2 @ 3 1/2

Sienna, American, Raw, 1 1/2 @ 1 1/2

Sienna, American, Burnt and Powdered, 1 1/2 @ 1 1/2

Talc, French, 1 1/2 @ 1 1/2

Talc, American, 1 1/2 @ 1 1/2

Terra Alba, French, 100 lb., 75 @ 80

Terra Alba, English, 70 @ 75

Terra Alba, American No. 1, 70 @ 75

Terra Alba, American No. 2, 45 @ 50

Umber, Turkey, Burnt and Powdered, 3 1/2 @ 4

Umber, Turkey, Raw and Powdered, 3 1/2 @ 4

Umber, Turkey, R'w Lumps, 2 1/2 @ 3 1/2

Umber, Turkey, Bnt. Amer., 1 1/2 @ 1 1/2

Umber, Turkey, R'w Amer., 1 1/2 @ 1 1/2

Yellow, Chrome, 10 @ 25

Vermilion, American Lead, 11 1/2 @ 12

Vermilion, Quicks'er, bulk, 57 @

Vermilion, Quicks'er, bags, 58 @

Vermilion, Quicks'alver sm'r pkgs, 62 @

Vermilion, English Import, 85 @ 90

Vermilion, Imitation, Eng., 8 @ 35

Vermilion, Trieste, 90 @ 92 1/2

Vermilion, Chinese, 92 1/2 @ 97

Whiting Common, 100 lb., 37 1/2 @ 42 1/2

Whiting Gliders, 45 @ 55

Zinc, American, dry, 4 1/2 @ 5

Zinc, French, Red Seal, 7 1/2 @ 7

Zinc, French, Green Seal, 9 @

Zinc, French, V. M. X., 7 1/2 @ 7

Zinc, Antwerp, Red Seal, 7 1/2 @

Zinc, Antwerp, Green Seal, 7 1/2 @

Zinc, German, L. Z. O., 6 1/2 @ 7 1/2

Zinc, V. M. in Poppy Oil, O. Seal, lots of 1 ton and over, 10 1/2 @ 11 1/2

lots less than one ton, 11 @ 11 1/2

Zinc, V. M. in Poppy Oil, Red Seal, 10 @ 10 1/2

lots of 1 ton and over, 10 @ 10 1/2

lots less than 1 ton, 10 1/2 @ 10 1/2

Discounts—French Zinc.—Discounts to buyers of 10 blbl. lots of one or assorted grades, 15¢; 25 blbls., 2¢; 50 blbls., 4¢. No discount allowed on less than blbl. lots.

Colors in Oil—

Black, Drop, Frankfurt, 25 @ 30

Black, Drop, English, 12 @ 15

Black, Drop, Domestic, 7 @ 10

Black, Lampblack, Best, 20 @ 35

Black, Lampblack, Common, 7 @ 18

Black, Ivory, 8 @ 15

Blue, Chinese, 35 @ 40

Blue, Prussian, 20 @ 45

Blue, Ultramarine, 12 @ 18

Brown, Vandyke, 7 @ 12

Green, Chrome, 8 @ 13

Green, Paris, 16 @ 18 1/2

Sienna, Raw, 7 @ 14

Sienna, Burnt, 7 @ 14

Umber, Raw, 7 @ 10

Umber, Burnt, 7 @ 10

Putty—

In barrels and 1/2 blbls, 0.13 @ 0.14

In tubs, 0.13 @ 0.14

